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ABSTRACT

Only by having an appreciation of how cable systems can be used, the attendant costs and limitations, can local authorities rationally evaluate its impact on the community. This report is intended to provide an introduction to the range of uses and communications services now possible with cable systems. The first part of the report includes a brief background and chronology of cable applications, a summary of the current regulatory framework, and economic factors that influence the use of cable. The main part reviews the uses and applications of cable: those mandated by the Federal Communications Commission (FCC), to which local authorities must structure their community objectives, and those not specifically mandated. Finally, conclusions and guidelines which may assist franchising authorities in planning for cable use are presented. This report also includes a cable uses survey on developments within defined nonbroadcast channels, pay television, and the hybrid that straddles the classifications. (Author/SH)

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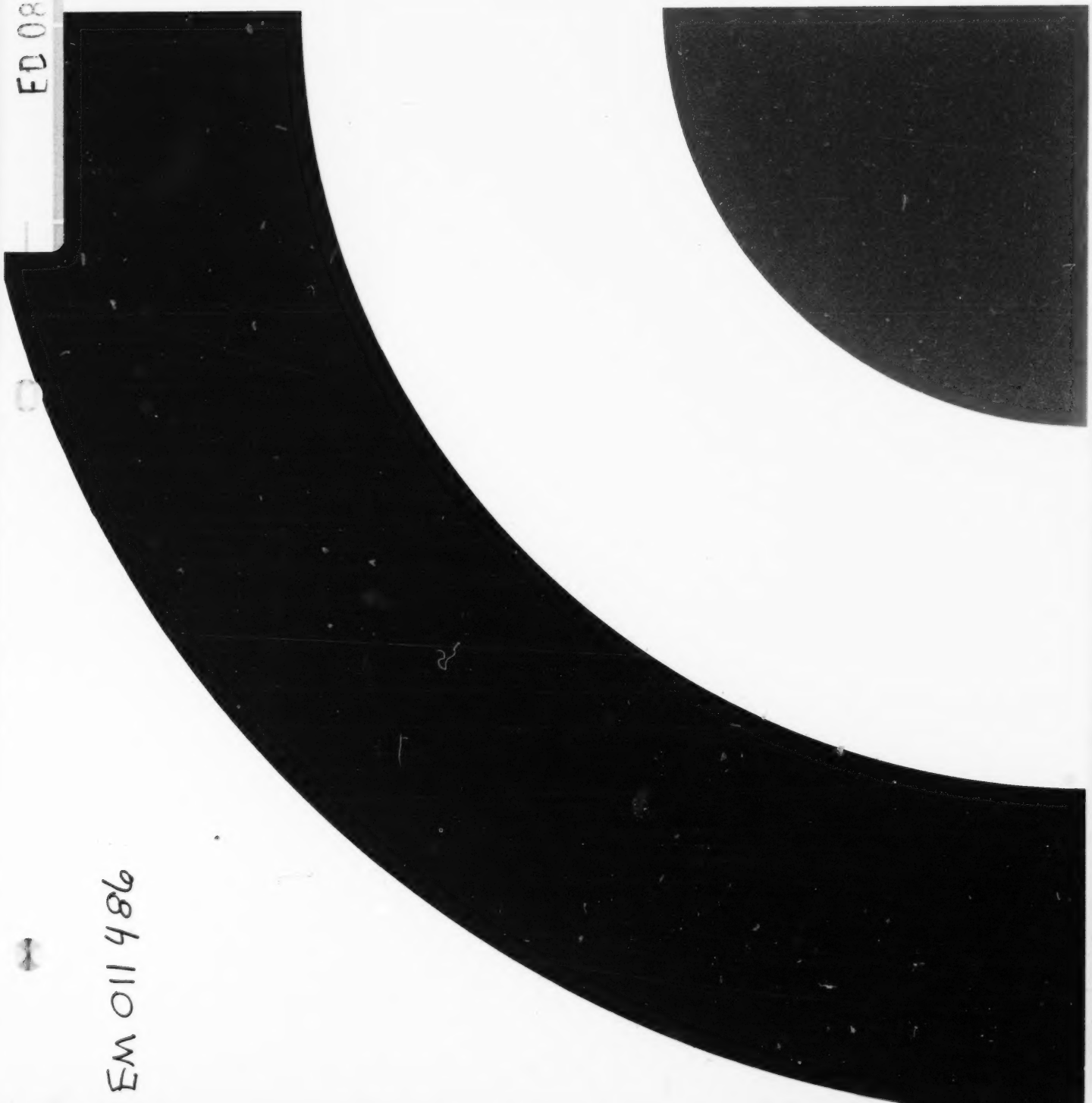

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THE USES OF CABLE COMMUNICATIONS

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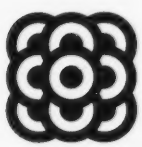

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PREFACE

This document was prepared by the Cable Television Information Center under grants from the Ford Foundation and the John and Mary R. Markle Foundation to The Urban Institute.

The primary function of the center's publications program is to provide policy makers in local and state governments with the information and analytical tools required to arrive at optimum policies and procedures for the development of cable television in the public interest.

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THE USES OF CABLE COMMUNICATIONS

INTRODUCTION

The growth of cable systems in the United States is usually described in terms of the number of systems in operation and the number of subscribers served. Although these totals are useful in portraying the extent to which cable reaches the public, a more complete portrayal of cable communications also includes the services cable provides now, and may provide in the future.

Only by having an appreciation of how cable can be used, and the attendant costs and limitations, can local authorities rationally evaluate its impact upon the community. Specific local needs can be better matched against cable system capability if there is some familiarity with cable uses and cost-performance tradeoffs.

Local authorities face the responsibility of determining what services a cable system should be able to provide, particularly in the area of nonentertainment communications. Here, the current Federal Communications Commission regulations leave relatively wide latitude to local authorities, in contrast to more rigid constraints on entertainment services.

During the franchise process, the franchising authority can involve itself heavily in defining future services, or that task can be left to the franchisee. In either case, this definition will have a strong impact on the way the cable system is designed and operated. If the franchising authority chooses not to act, the franchisee will surely structure the cable system from the point of view of economic self-interest. This decision is certainly legitimate, but frequently it may not coincide with community priorities. Many desirable communications services could be foreclosed or made considerably more costly in the future, if it happens.

This report is intended to provide an introduction to the range of uses and communications services now possible with cable systems. It includes those services required by the FCC, and also those anticipated in the foreseeable future. While some of the latter are technically feasible, it remains to be demonstrated whether or not they will be economically viable.

The first part of the report includes a brief background and chronology of cable applications, a summary of the current regulatory framework, and economic factors that influence the use of cable.

The main part reviews the uses and applications of cable. The first group of uses includes those mandated by the FCC's regulations. Local authorities, in these cases, must structure their community objectives to be compatible with federal constraints. The second group contains applications and services not specifically mandated at this time. Considerably more flexibility is available to cities as to how, when and under what circumstances these services shall be introduced to cable.

Finally, conclusions and guidelines which may assist franchising authorities in planning for cable use are presented.

Background

EVOLUTION OF CABLE SYSTEMS

The classical employment of cable systems (and the one which still produces almost all system revenues) has been as a retransmission facility for off-the-air broadcast television programs. The cable system's antenna picks up the broadcast signals, which are then processed and sent through the network of cables, eventually reaching each subscriber's television receiver.

This service provides either or both of two features:

— a better television picture in areas of poor off-the-air reception

— a wider choice of programs, by bringing in stations that could not be received at all in the service area.

In many remote, rural areas of the country, this service is entirely sufficient to achieve high subscriber penetration and community satisfaction.

Larger communities still remaining to be cabled, however, are generally served by more broadcast television stations and the off-the-air signal usually is strong enough to receive good quality pictures. Here, there is pressure on the part of both the community and the cable system operator for developing new cable uses and services. The operator wishes to attract subscribers and the retransmission service, by itself, may not attract enough. The community, likewise, may see little need for a cable system unless it provides services of interest or of benefit. The FCC has also taken this position, specifically mandating certain new services and the technical capacity to add others in the future.

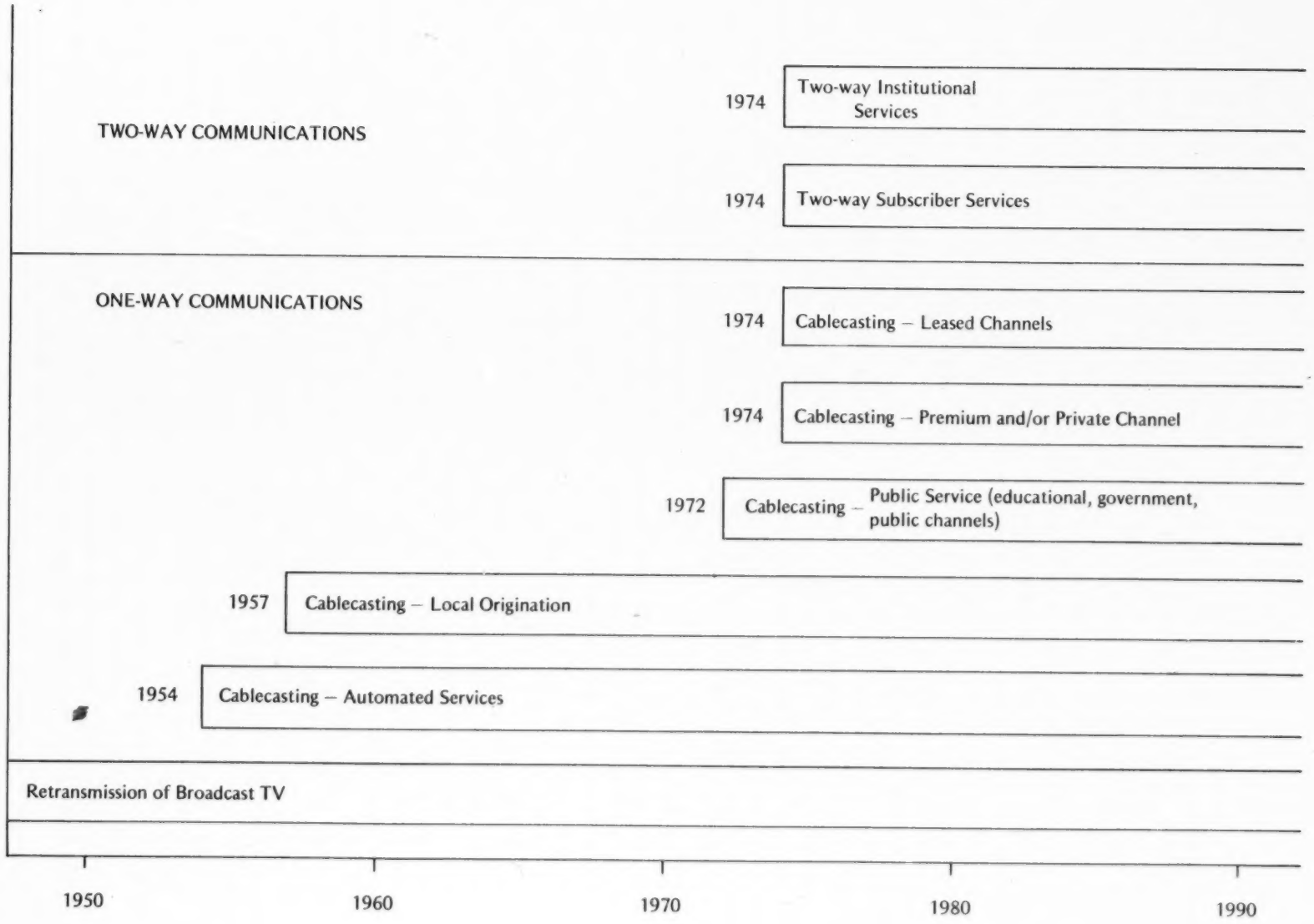

Figure 1. Evolution of Cable Uses and Services

Figure 1 illustrates the evolution of cable services, both up to the present and as projected through a fifteen-year life of a new franchise, circa 1975-1990.

As shown, the retransmission function of the cable system was the first developed and will continue to play a strong role into the foreseeable future. Other applications, however, are expected to increase dramatically in scope.

In the mid-1950's, a number of cable systems began to cablecast, sending to subscribers program material that originated at a cable system studio rather than being picked off-the-air. The cable operator, for the first time, assumed a creative responsibility for programming.

For smaller systems, cablecasting often consisted exclusively of automated services. This might be a video camera scanning clock and weather indicators, sending unattended pictures continuously over an unused channel. A more elaborate service would consist of equipment connected to a stock market or news ticker that would convert those data into a line-by-line video display.

These services are still popular, and can be provided at modest cost since they require no studio or programming personnel. As of March 1972,[1] about 52 per cent of all operating cable systems originated only automated cablecasting.

To further increase audience interest and attract more subscribers, a limited number of system operators expanded their studio facilities to provide a full range of cablecasting (e.g., live, videotaped or film programs). Usually, one cable system channel was designated the "local origination" or "system" channel and was reserved for programming provided by the system operator.

As of March 1972, about 22 per cent of the operating systems provided local origination programming. As an added impetus, recent FCC regulations require that systems with more than 3,500 subscribers must originate programming.[2]

The FCC's cable regulations require that cable systems in the 100 largest television markets provide, in addition to a local origination channel, access channels for the public at large, and for educational and governmental authorities. Additional channels must be provided to be leased for new services.

From within the cable industry, considerable development activity has taken place in the area of pay cable, also termed "premium television." These terms are defined to mean that payment is made to view a specific program or group of programs, rather than on a monthly fixed rate basis as for the retransmission service.

Since pay cable, unlike many other applications, may provide immediate increased revenue to the cable system operator, there is understandable enthusiasm to bring it to fruition as soon as possible. Various techniques have been developed, with the first large market tests expected in 1973-75.

All of these services, with the possible exception of pay cable,[3] fall into the category of one-way communications services. In each case, signals from the cable system headend are transmitted in one direction down the cable network to subscribers.

Almost all cable systems now operating in the United States are one-way systems. A few prototype two-way systems are ready for test, and are described later in the report. It will be some time before these tests indicate either market demand or technical feasibility for two-way services. Until then, one-way communications services and uses will predominate.

As shown in Figure 1 these can include, in addition to pay cable, the important areas of public communications and, through channel leasing, business and commercial communications to cable subscribers.

With the advent of two-way communications capability, cable systems can offer many new services. Two-way communications can convert cable systems from "passive" to "interactive" use, changing the nature and importance of cable services in a significant way. The change can be compared to the difference between having an AM-FM radio receiver — a passive device — and a telephone — an interactive device which permits a communications dialogue.

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[1] TV Digest's 1972-73 CATV & Station Coverage Atlas, p. 22a.

[2] In *United States v. Midwest Video Corp.*, 406 U.S. 649 (1972), the United States Supreme Court upheld the FCC's authority to impose the origination rule. However, while the litigation was before the courts, the commission stayed the effect of the rule pending the outcome of the litigation.

Nevertheless, when the Supreme Court ruled in favor of the FCC, the commission did not vacate the stay. There is some question as to whether it was necessary for the FCC to take such action since the stay may have expired by its own terms. Although the commission's Cable Television Bureau takes the position that the rule is not in effect, local authorities might well anticipate that it will be in the near future.

[3] Some aspects of pay cable, such as automated billing and ordering programs through the cable link itself, require two-way communications capability. Other approaches use telephone lines as the return link, or self-contained decoder terminals in the subscribers' homes, and consequently are compatible with one-way systems.

In general, these services are expected to fall into two broad categories. "Subscriber services" are those in which the communication, in either direction, is between the headend and the system's subscribers. Typical examples are audience polling, automated shopping, home fire and burgular alarm monitoring, utility meter reading, etc.

Such services lend themselves to control by a computer at the headend. Each subscriber home would have a terminal that carries a unique address, and these would be polled in sequence. The message from the subscriber (which could be a button pushed to signify "I want to buy chair No. 645," or an automatic reading of the subscriber's electric power meter) would then be sent "upstream" to the headend, recorded and processed.

The second broad category is "institutional services." These would include, for example, data communications between bank branches or business offices, or transmission of an educational program from one school to others, or a television link between a hospital and a clinic. Many of these services would have no relation at all to the subscribers of the cable system.

In the future, the evolution of cable systems may include other applications and uses not imagined at this time. Even those now considered feasible, however, pose many complex questions to franchising authorities and communities. As one example, some of the uses may be commercial and others considered as public services. The question of who pays the cost of each type of service, and in what proportion, and under what organizational structure, looms as one that will not be easy to solve.

CURRENT REGULATORY FRAMEWORK

Cable television began as an industry regulated only by local franchise constraints. These were similar in scope to those involving any use of city streets and rights-of-way, and were designed primarily to assure that the system was installed in a manner consistent with construction and safety codes.

For some time, the Federal Communications Commission declined to assert jurisdiction over cable. Since no new over-the-air transmission was involved, its position was that the federal regulation was not called for.

Two factors combined to influence the commission to change this position. First, microwave relaying of distant television signals became a factor in cable operations, and this involved application for FCC licensed frequencies. Second, the rapid growth of cable was perceived as an increasing threat to the broadcast industry, itself subject to the FCC's regulations.

The FCC issued its *First Report and Order* on cable television in 1965, in which it asserted jurisdiction over microwave-linked cable systems. In 1966, in its *Second Report and Order,* jurisdiction was broadened to include all cable systems, whether or not microwave links were used. This jurisdiction was tested in the courts, and affirmed by the Supreme Court in 1968.[1]

The *Second Report and Order* also imposed restrictions on bringing distant television signals into the top 100 markets. This constraint resulted in a virtual freeze on franchising in the major urban and suburban centers of the country, since cable operators believed that attracting subscribers without offering such distant signals was unlikely in areas which already had good off-the-air TV reception.

In 1972, the commission issued its *Third Report and Order,* which lifted some of the importation restrictions and simultaneously imposed a number of other requirements for major market cable systems. This latest *Order* permits expansion of cable into major markets. However, it contains restraints which are designed, in the view of the FCC, to limit the competitive threat to the existing broadcast industry, and also to stimulate the use of cable for nonbroadcast services.

The commission's objective — to permit the growth of cable while simultaneously constraining its competitive posture — poses many problems, not only for cable operators but also for the franchising authorities. Some areas of regulation have deliberately been left open by the FCC to permit further experimentation and development of new cable services. Whether a local government can assume regulatory authority to these areas is not always clear.

Some of the ambiguities may be resolved by the commission's requirement that each newly franchised cable system must apply for, and receive, a "Certificate of Compliance" from the FCC before it can begin to carry broadcast television signals. This permits the commission to determine whether the franchising process, the franchise agreement, and the cable system design have complied with its requirements.

The certification process also permits the applicant and/or the franchising authority to request waivers of the FCC's requirements in any area

[1] *Southwestern Cable Company v. United States,* 392 U.S. 157 (1968).

where sufficient justification can be demonstrated. This waiver possibility allows a degree of flexibility in structuring a franchise to meet each community's individual objectives. It will be particularly important in the next few years, while the commission may not have frozen its position, and will be most receptive to new approaches.

Thus far, there has been informal indication by the FCC that waivers may well be granted when a franchising authority has a specific plan for use of the cable system and can demonstrate that the system's economic viability will not be impaired. This "indication" remains to be tested in sufficient cases to confirm that the commission will, indeed, allow such latitude to local authorities.

Consequently, a two-tier regulatory system exists today with the FCC regulating the areas of:

— Broadcast television and radio signal carriage
— Program exclusivity
— Channel capacity
— Cablecasting
— Operational procedures and requirements

Local authorities may regulate such items as:

— Selection of franchisee
— Subscriber rates
— Monitoring system's performance and compliance
— Operation of municipal channels

A critical question is whether local authorities can also impose requirements in the areas regulated by the FCC. Can a franchising authority, for example, require more channels than the commission requires? Or can it designate the "local educational authorities" for whom an access channel must be reserved? Preliminary FCC reaction seems to indicate tentative approval, but with restrictions. Certainly, the answer to such questions is far from clear in many cases, and may be resolved only through the certification process (including waivers).

The prospect of a third tier of regulation, by the states, also appears to be increasing. Although only a few states have enacted cable regulations, the trend indicates that almost all, within time, will exert some degree of authority. State regulation may be limited to such areas as regional planning for cable or interconnection among systems, or it may preempt many areas now left to localities.

In the long term, cable may well be categorized as a utility or common carrier and some aspects of the medium regulated in a fashion similar to the telephone companies. A Cabinet level committee is now considering such a recommendation.

While all of these factors do complicate the regulation of cable television, there is still ample room for the exercise of creative planning at the local level. Whether on a waiver basis or not, the goal of each franchising authority should first be to define a cable system which best meets that community's individual objectives. Second, within the constraints imposed at the federal and state levels, the franchising authority should attempt to ensure that the defined system is the one that will be installed.

CURRENT FCC REQUIREMENTS

In terms of the specific uses to which a cable system may be put, current FCC regulations establish minimum requirements while simultaneously providing capacity for development of new services.

For new major market systems, the commission requires the following "designated" services:

Retransmission service
Mandatory carriage of local broadcast television stations.
Permissible carriage of distant broadcast stations up to defined limits (usually one or two).

Local origination service
At least one channel, under the control of the cable operator, devoted to local, nonautomated programming.

Public access service
One free channel for the use of the general public on a non-discriminatory, first-come, first-served basis.

Educational access service
One channel, free for at least five years, reserved for use by local educational authorities.

Government access service
One channel, free for at least five years, reserved for government uses.

Leased access service
A number of channels available for lease to others who wish to provide new "undesignated" services via the cable.

In addition, the FCC requires a 20 channel minimum capacity. At least one channel must be available for nonbroadcast use for each channel used to carry broadcast signals. Thus, if 12 broadcast signals are carried, the system must provide at least 24 channels.

With regard to two-way communication, the commission requires only that the cable system be capable of eventually providing return "nonvoice"[1] signals from the subscriber to the

[1]This may consist, in the simplest form, of "on-off" or "yes-no" signals that are determined by the position of an electrical switch or pushbutton.

headend, without "time-consuming and costly system rebuilding." No time schedule for implementing this capability, or for providing a wider range of two-way communication, is imposed.

Cable systems outside the 100 largest markets are not presently required by the FCC to provide the access services, and must originate programming only if they serve more than 3,500 subscribers. The system capability actually provided is therefore much more a function of local franchise specifications.[1]

Summary of Cable Economic Structure

Since almost all significant revenue to date has come from retransmission service to subscribers, cable system operators face a difficult decision in determining which new services to implement. Costs are uncertain and the market demand is unclear, posing a high financial risk.

This may be illustrated by an example. For a 12 channel one-way system, at $5,000 per cable mile, assume a subscriber density of 100 dwelling units per mile (typical suburb). Thus, it costs about $50 per dwelling unit passed to build the system and, for a subscription level of 50 per cent, this is equivalent to $100 per subscriber. At a lower penetration of 33 per cent, the cost would be $150 per subscriber.

Subscriber revenues have averaged $5 to $6 per month for basic subscriptions, buildings up to $6 to $8 when second set and converter[2] charges are added. Thus, an annual average revenue might be $75 to $85 per subscriber.

With this cost/revenue relationship, even including annual operating expenses, cable systems normally turn profitable in about the fourth or fifth year after construction, and provide a relatively high return on investment thereafter. These economics are keyed to the smaller systems which were built outside the top 100 markets in the past. For newer, larger systems which are now being constructed inside the top 100 markets, the economics are not as favorable. If, however, a higher capacity system were to be installed — as required by the FCC — with more channels and two-way capability, the capital cost might now be $10,000 to $15,000 a mile for the same community. This would result in a doubling or tripling of the cost per subscriber, up to perhaps $200 to $400 per subscriber. Furthermore, this cost does not include the special terminals that would be required to actually take advantage of new services. (A two-way subscriber terminal may cost $300 to $1,000).

The revenue from each subscriber will still be in the $75 to $85 range until new uses and services have been fully tested and a firm market demand established. Since this may take perhaps 5-10 years, the system may show substantial losses until then.

This is the economic dilemma facing many new, major market cable systems, and the reason for the reluctance on the part of operators to take the risk. Yet, if the risk is not taken, it probably will cost substantially more to upgrade or modify cable systems in the future to provide new services, when the demand has been established. Many services, in fact, may be foreclosed entirely if not planned for in the initial system. (As an example, the reliability of the cable system may be adequate for retransmission, but inadequate for an alarm system or for business communications. Reliability is difficult to "add on" at a later date.)

Franchising authorities, in establishing cable system requirements for their individual communities, must decide how much capability for future services is to be provided initially, and how much can be added later. Some of the data base necessary for such a decision may come from the franchise applicants, but local authorities should also have independent sources of information on the technical and economic implications of each option.

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[1]Although a system not located in the top 100 markets need not provide access or leased channels, the franchising authority may require that some or all of those types of channels be provided. If any or all of these access channels are required, the FCC's rules governing content control, assessment of costs and operating rules apply (see 47 C.F.R. 76.251 (b)). Moreover, as is the case with top 100 market systems, if the franchising authority wishes to exceed the FCC's requirements as to the number, availability and administration of these access channels, the local authority must present to the FCC justification for imposing the requirement, explaining the need and detailing a plan for their use.

[2]A converter is a device used by systems with more than 12 channels relayed on a single cable to convert non VHF-TV signals into standard VHF channels.

THE USES OF CABLE COMMUNICATIONS

In the review of cable system uses and services that follows, the first category includes those required by current FCC regulations.

Federal Communications Commission Required Services

As a minimum, major market cable systems must be capable of providing those services defined and required by the FCC's regulations. Each such service bears related costs, and some require clarification and resolution of a variety of new policy issues.

RETRANSMISSION OF BROADCAST TELEVISION

Here, local authorities have less flexibility than in other applications, since the commission's rules are more detailed and specific regarding signal carriage than for any other service. There is still, however, some room for franchising authorities to influence decisions on retransmission services, particularly with respect to permissible carriage, as described below.

The mandatory carriage provisions mean, in effect, that the cable system must carry all the broadcast television signals that can be viewed off-the-air in any part of the geographical area served by the cable. This includes:

— All local broadcast television stations, VHF and UHF, located within 35 miles of a designated reference point for each city, specified in the FCC's rules.

— All noncommercial educational television stations whose Grade B signal contours[1] reach any portion of the franchised cable area. This may include stations more than 35 miles from the reference point.

— All signals rebroadcast by television translator stations,[2] with 100 watts or more power, licensed to the franchised community.

— "Significantly viewed" stations in the county in which the community is located. The FCC both defines "significant viewing"[3] and provides a list of stations currently in this category for every county in the country.

In addition to this mandated carriage, the FCC will permit, at the option of the cable operator and the franchising authority, carriage of other signals under a varying set of constraints, depending upon the size of the television market. Here, franchising authorities have some power to affect the choice of carriage.

The rules applying to permissible carriage are tailored to match the estimated ability of the different television markets to withstand the distant signal competition of cable. The intent is to prohibit unrestrained selection of new program material for cable systems which might diminish the broadcast viewing audience to the extent of producing significant economic damage.

To accomplish this, the commission has arbitrarily divided the 100 largest markets into two groups, the top 50 and the second 50. The assumption is that there is a difference in the competitive strengths of television stations in these two groups. Consequently, the FCC has formulated different rules on signal importation for each, and also for markets smaller than the top 100.

The present regulations permit the following:

Markets 1-50

— Can import distant stations until a total of three network and three independent stations are provided (basic service);[4]

— Can import any distant educational and non-English language stations.

Markets 51-100

— Can import distant stations up to a total of three network and two independent stations (basic service);[4]

— Can import any distant educational and non-English language stations.

Markets outside top 100

— Can import distant stations up to a total of three network and one independent station (basic service);

— Can import any distant educational and non-English language stations.

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[1]Grade B signals are those which provide good picture quality at least 90 per cent of the time to at least 50 per cent of an area's receivers.

[2]Translators are single channel relay stations which receive, amplify, and rebroadcast a television signal.

[3]A network station is considered significantly viewed if it commands a share of 3 per cent of total weekly viewing hours (an independent, at least 2 per cent). Current determinations are based on the 1971 American Research Bureau "Television Circulation Share of Hours" survey. These may be changed in the future by independent professional audience surveys that update viewing habits.

[4]If basic service already exists, up to two additional independent stations can be imported into the 100 largest markets.

Radio retransmission (all markets) — A proposed rule making pertaining to cable transmission of radio signals is presently pending before the commission. As an interim measure, the commission is applying the following policy: a cable operator may import any radio signals licensed to a community within 75 miles of the cable community; however, stations beyond the 75 mile limit may not be imported into cable communities with populations of less than 50,000 which have licensed radio facilities.

Although these regulations are specific, the commission appears — at least at this time — to regard them as an initial set of constraints rather than dogmatic absolutes. An opportunity is provided for waiver, but this depends upon the objections that may be raised in each case. Strong opposition from local broadcast stations to relaxing signal importation rules may be a significant factor. For example, local educational television stations can object to bringing in distant educational stations without limit, and the FCC presumably will rule on a case-by-case basis.

Not only does the commission limit the number of channels that can be carried, but it also lays down exclusivity rules. These are relatively complex, and specify cases in which individual programs or series must be "blacked out" to protect the exclusivity rights of local broadcast stations carrying those programs. During periods of blackout, those channels which are affected can carry other imported signals.

One important issue is how critical imported signals are to the economic viability of the cable television system. Previous studies[1] have attempted to relate subscriber penetration to distant signal importation. Since some assumptions and data base information for these studies relate more to traditional, rural area CATV systems than to the new, more complex urban systems, it is difficult to make this assessment accurately. Whether a previously unattractive market becomes viable simply by bringing in one or two non-local stations, with their attendant exclusivity restrictions, is open to serious question.

Importation, even when permissible, is subject to other restraints. If a distant network signal is imported, it must come from the closest broadcast station of the appropriate network, or, at the option of the cable operator, the closest within the same state. When an independent station signal is imported, if it is selected from among those in the top 25 markets, it must be taken from one of the two closest such markets.

Distant signal importation is presently accomplished by microwave links since the longer distances involved generally make cable links unfeasible. Just as for a conventional cable television system, a tower (and antenna) is located at a point where it can pick up a good quality signal from the desired TV station. The signal is then modulated (placed on a microwave carrier frequency) and sent from a transmitter to a receiver. One microwave link may be sufficient for distance of 20 to 50 miles. For greater distances, a series of links is used.

The cost of signal importation is not trivial. It depends upon the number of repeater links required and may range from a minimum of $25,000 to $50,000 for single links to as high as $100,000 to $200,000 or more for long distances or difficult terrain.

As an example, assume that a distant TV station is 300 miles from a cabled community and that its signal is to be imported. At an average 30 miles per repeater link, a total of 10 links are required. For each link, a suitable site (purchased or leased) and a tower, receiver, transmitter, filters, and antennas are required. The cost per link will vary since at each location a different size tower may be required. But a reasonable average would be $15,000. The total cost merely to be able to import this single distant station would be approximately $150,000 and this figure is exclusive of continuing operational and maintenance expenses. If two distant stations are imported from opposite directions, depending upon the distance, the capital investment might well be doubled. If there is an opportunity to share part of the route, however, the cost would be proportionately less.

In some cases, the cost of distant signal importation can be shared by two or more cable systems. For example, two systems in the Los Angeles metropolitan area might both desire to import a distant signal from San Francisco. Rather than each paying for a separate microwave importation network, they might share the cost of the same links from San Francisco down to a point in the Los Angeles area midway between the two cable systems. From this point, separate links could feed to each cable headend. Thus, two systems could import the distant signal at a cost slightly more than half of the cost for either to undertake the importation on its own.

Even before domestic satellites are in operation, this technique may be tested. The TelePrompTer Corporation has recently applied to the FCC for permission to lease channels on the presently

[1]See, for example, Park, R. E., "Prospects for Cable in the 100 Largest Television Markets," Rand Report R-875-MF, Oct. 1971.

orbiting Canadian satellite, ANIK. TelePrompTer's plan is to beam programs up to the satellite and receive tham at various locations through the use of a transportable, low cost (around $100,000) ground terminal. The commission has granted a preliminary waiver permitting the company to conduct feasibility experiments, using a van-mounted, mobile earth station. If final FCC approval is received, this technique might be operational in 1974-75.

Policy Considerations

Although franchising authorities presently have less control over the cable system's retransmission function than over other services, there are still some policy issues to be considered and a number of areas in which local influence can be exerted.

With respect to permissible carriage, even without waiver requests, localities can formulate objectives for:

— Carriage of radio signals (How many? AM and FM? Distant importation?)
— Importation of distant television signals (Is importation necessary? If so, what choices are open? What are the costs?)

This cost sharing can be achieved either by joint (or multiple) use of the same dedicated CARS[1] network or by rental of common carrier facilities. In the San Francisco-Los Angeles case, for example, specialized common carriers such as Western Tele-Communications provide video microwave links for just this purpose.

Whether or not the importation cost is shared, it represents a substantial incremental expense. This cost must be recovered, either in the form of higher subscriber charges or, indirectly, by attracting more subscribers to the system. If, in fact, signal importation does not attract many new subscribers, the burden will fall on the existing subscribers. Because it is such a significant portion of the total costs, both the franchising authority and the cable operator must weigh carefully the decision to import signals.

A new and potentially important technique for bringing distant signals to cable systems is via the use of satellite links. The FCC is considering the authorization of a number of domestic communications satellites. Several of these are designed to relay signals to cable systems, initially to regional ground stations that would distribute them by microwave or cable to a cluster of systems.

[1]Community Antenna Relay Service Band (12,700-12,950 megahertz).

For example, there is no limitation on importation of foreign language stations. In cities like New York or Los Angeles, with large Spanish-speaking minorities, such programs may make a crucial difference to a considerable portion of the population.

Similarly, importation of educational stations is not limited (unless the FCC upholds an objection by a local educational broadcaster). These stations generally do not boast a large audience, and consequently cable system operators are sometimes reluctant to import them. If, however, a franchising authority determines that importation is in the public interest, it may include such a requirement in its franchise provisions.

In any event, local authorities should determine the intent of each franchise applicant with respect to distant signal importation. Since this is an optional, rather than a mandatory, service, it cannot be assumed that all applicants will provide the same service.

LOCAL ORIGINATION

Cablecasting

It has been noted that the FCC's requirement that systems with more than 3,000 subscribers originate non-automated programming is somewhat in limbo, not having been officially reinstated after the commission's court victory. Regardless of the legal interpretation, however, the trend toward increasing origination appears destined to continue. In part, this is due to the fact that a number of cable operators see origination as attracting a broader base of subscribers.

From the local authorities' point of view, local origination is especially important since it can provide much in the way of special community interest programs. Network television broadcasting is aimed at the largest possible national audiences. Local independent television stations are more attuned to community needs but also are influenced by the economics of mass markets. Cable has been hailed as a true community oriented medium, and local origination cablecasting is a test of this forecast.

As a result, many localities in their franchise ordinances have insisted on establishment of a centrally located cablecasting studio (sometimes several) and a regular schedule of cablecasting. In some cases, even the selection of the franchisee has been based to a large extent on the applicant's commitment to local programming.

The current FCC regulations affecting local origination state that:

• No cable system having 3,500 or more subscribers shall retransmit any broadcast signals unless it "also operates to a significant extent as a local outlet by origination cablecasting and has available facilities for local production and presentation of programs other than automated services. Such origination cablecasting shall be limited to one or more designated channels which may be used for no other purpose."

• No cable system outside the major markets shall enter into any agreement which "prevents or inhibits the use of such facilities for a substantial portion of time (including the time period 6-11 PM) for local programming designed to inform the public on controversial issues of public importance."

Thus, cable systems with more than 3,500 subscribers are required to cablecast as a continuing service. Smaller ones, while not required to cablecast, must use any cablecasting facilities they wish to construct, for local interest programming a "substantial portion" of the prime time.

The cable system operator has sole programming responsibility for the local origination channel, subject to specific constraints which involve the areas of application of the "fairness doctrine" and prohibition of lotteries and obscenity.

The "fairness doctrine" applies to cable in essentially the same way as to broadcasting. If one candidate for political office uses the channel, all others must be granted equal time.[1] Charges for time, and use practices must be uniformly applied.

Lotteries, or "any advertisement of or information concerning any lottery, gift enterprise, or similar scheme, offering prizes dependent in whole or in part upon lot or chance" are prohibited on the local origination channel.

Also prohibited is the cablecasting of "material that is obscene or indecent." While this prohibition is consistent with similar rules for broadcast TV, and indeed all telecommunications media subject to government regulation, enforcement may be more difficult for cable. First, the multiple tier cable regulatory scheme diffuses the question of responsibility for enforcement. Secondly, the legal definition of obscenity consistently presents courts and enforcement agencies with a most perplexing problem. It appears that this problem of lack of definite standards for what is obscene will not be alleviated by the recent Supreme Court decisions on the subject.[2] In fact, insofar as these decisions provide that allegedly obscene material is to be judged in light of the prevailing community standard — as opposed to the former national standards test, the commission's obscenity rule may become even more difficult to apply. Finally, there is a seeming paradox in the commission rules: at the same time that they state that the cable operator must not control the content of programming over the public access and leased channels, they also mandate that the system not transmit indecent or obscene material.[3]

Advertising is permitted at the beginning and end of programs and at "natural intermissions or breaks," which conforms in general to broadcast practices. Since the orientation of the origination channel presumably is to the local community, cable operators solicit advertising from "neighborhood" businesses and stores to a greater extent than does broadcasting.

Per-program and/or per-channel charges, which in effect means pay cable, are permitted. However, there are specific restrictions designed to prevent cable from siphoning off programs from both the broadcast and film industries. For example, feature films that have had general release in the country prior to the last two years may not be cablecast, while films in general release for over ten years can be shown only one week in each calendar month. Thus, films released in the prior 2 to 10 years are unavailable to pay cable. Since this group constitutes the bulk of broadcast television's film library, the potential threat to that investment has been negated.

Similarly, sporting events that have been seen on broadcast television at any time in the prior two years may not be cablecast for pay, and, in addition, events occurring at more than two-year intervals (e.g., the Olympic Games) also are prohibited if they were previously broadcast.

"Series" type programs, which feature an "interconnected plot or substantially the same set of characters" are also banned for cablecasting on a per-program basis.

Operating within the above constraints, the cable system operator is the sole judge of what is presented on the origination channel. Smaller systems may feature interviews with community figures, local sporting events, panel discussions and the like. The larger multiple system operators

[1] Bona fide newscasts, documentaries and news interviews are excepted from this provision.

[2] *Miller v. California* and accompanying cases _____ U.S. _____, 41 L.W. 4925 (June 21, 1973).

[3] A case in point recently arose in New York City, when a videotape shown on a public access channel drew complaints of obscenity. The problem is that neither the cable operator nor the city are permitted to exercise control over the program content of the public access channel. This leaves the program producers, each of whom would be expected to have differing definitions of obscenity.

(MSO's) often prepare filmed and taped programs of more professional quality and general interest, and in many cases may use the same program material on a number of their cable systems. TelePrompTer, in its satellite networking application, has already announced plans to rebroadcast kinescopes of popular old television programs such as "The Ed Sullivan Show," "Playhouse 90" and "Show of Shows." These would be beamed up to the satellite and distributed to earth stations linking a number of cable system headends. Thus, all of TelePrompTer's systems throughout the United States, for example, could show the same program on their individual local origination channels.

Networking, whether via satellite or other links, can undeniably reduce programming distribution costs and provide a larger viewer base. This, in turn, may be expected to increase the attraction for advertisers and produce more advertising revenue. Economic self-interest, therefore, will lead cable operators in the direction of networking, much as the broadcasting industry has developed.

It should be recognized, however, that networking is the direct antithesis of programming aimed individually at each local community. To the extent that either predominates, the other must suffer. One task for each franchising authority, therefore, might be to strike a balance between the two which is equitable both for the cable operator and for the public interest. The franchising authority might specify in the ordinance that the balance between local origination programming and outside produced programming is of great concern, and applicants' plans in this area will weigh significantly in the award of the franchise; the authority might even decide that it wishes to specify this ratio. With such a balance, the local origination channel can fulfill a dual function. It can serve as a significant outlet for local interest programs which may command a smaller but highly concentrated and motivated audience. Simultaneously, it can also offer broadly based programming alternatives to the television fare currently available.

Figures 2 and 3 illustrate, respectively, a typical week's origination programming on a small and a large cable system. It may be noted that the schedule for the small system is almost exclusively local in nature. Regardless of the quality of programming (which varies greatly among the systems that originate), smaller cable systems generally will tend toward localization. In part, this is due to a greater degree of community isolation and in part, the financial and staff resources limit the possibilities of producing or acquiring programs broader in scope.

Figure 2. Typical Local Origination Programming - Small Cable System

Wednesday PM	
3:00 to 3:30	Parachute Club – Bob Hansen
3:30 to 4:00	Teen Music
4:00 to 4:15	Tahoe Douglas Rotary
4:15 to 4:30	Toastmasters – Virgil Morris
4:30 to 4:40	Local News
4:40 to 5:00	City Recreation Director – Walt Little
5:00 to 6:00	Country-Western Music
6:00 to conclusion	City Planning Commission Meeting
Thursday PM	
3:00 to 3:15	Hot Rod Racing Club – Hatcher
3:15 to 3:30	Open
3:30 to 4:00	Teen Music
4:00 to 4:15	School Music Teachers
4:15 to 4:30	High School Civic Time
4:30 to 4:40	Local News
4:40 to 5:00	Intermediate School
5:00 to 6:00	Country-Western Music
Friday PM	
3:00 to 3:30	Ministerial Association
3:30 to 4:00	Teen Music
4:00 to 4:15	Civil Air Patrol
4:15 to 4:30	Boy & Girl Scouts
4:30 to 4:40	Local News
4:40 to 5:00	Area Hunting – Tisher
5:00 to 5:15	Bowling Scoreboard
5:15 to 6:00	Country-Western Music
Monday PM	
3:00 to 3:30	Interviews – Harry Sharp
3:30 to 4:00	Music Time
4:00 to 4:15	Lions & Kiwanis
4:15 to 4:30	Chamber of Commerce – Peak & Simpson
4:30 to 4:40	Local News
4:40 to 5:00	South Shore in Motion – Bob Rusk – Fireman
5:00 to 6:00	Country-Western Music
6:00 to conclusion	Scout Presentation
Tuesday PM	
3:00 to 3:30	Interviews – Smith Camp Ground
3:30 to 4:00	Music Time
4:00 to 4:15	High School Time – Students
4:15 to 4:30	Optimists Club
4:30 to 5:00	J.C. Time
5:00 to 6:00	Country-Western Music
8:00 to conclusion	City Council Meeting

Figure 3. Typical Local Origination Programming — Large Cable System

Thursday PM	pm 2:00	Movie - "Rocketship XM" (Science Fiction)
	3:30	Movie - "Laughing Lady" (C) (Romance)
	5:00	Movie - "Angels One Five" (Drama)
	6:50	Community Bulletin Board
	6:55	Theta News Update
	7:00	Microwave Magic
	7:30	World Affairs Council
	8:30	I Always Come Back To The Himalayas
	9:00	Theta News Update
	9:05	Movies For Swingers: "Curves In The Road" (Drama)
	11:00	Movie - "The Black Whip" (Western)
	am 12:30	Movie - "If I'm Lucky" (Musical)
Friday PM	pm 2:00	Movie - "Affair In Reno" (Drama)
	3:30	Movie - "Rocketship XM" (Science Fiction)
	5:00	Movie - "Laughing Lady" (C) (Romance)
	6:50	Community Bulletin Board
	6:55	Theta News Update
	7:00	Window On Washington
	7:30	City Hall Report
	7:45	The Community Speaks
	8:00	College Baseball: East Los Angeles vs. Santa Monica
	10:00	Theta News Update
	10:05	Movies For Swingers: "Curves In The Road" (Drama)
	midnight 12:00	Movie - "Angels One Five" (Drama)
	am 1:30	Movie - "The Black Whip" (Western)
Saturday PM	pm 1:30	Microwave Magic
	2:00	Leslie The Shreve (Pre School)
	2:30	Movie - "If I'm Lucky" (Musical)
	4:00	Movie - "Affair In Reno" (Drama)
	5:30	Movie - "Rocketship XM" (Science Fiction)
	7:00	Servicios de Salud Mental
	7:30	College Swimming: Santa Monica vs. East Los Angeles
	9:00	Movies For Swingers: "Curves In The Road" (Drama)
	11:00	Movie - "Laughing Lady" (C) (Romance)
	am 12:30	Movie - "Angels One Five" (Drama)
Sunday PM	noon 12:00	Tele-Auction
	3:00	Movie - "The Black Whip" (Western)
	4:30	Movie - "If I'm Lucky" (Musical)
	6:00	Movie - "Affair In Reno" (Drama)
	7:30	Cine Especial - "Barrio Gris"
	9:30	Movies For Swingers: "Curves In The Road" (Drama)
	11:30	Movie - "Rocketship XM" (Science Fiction)
	am 1:00	Movie - "Laughing Lady" (C) (Romance)
Monday PM	pm 2:00	Movie - "The Fabulous Dorseys" (Musical)
	3:30	Movie - "The Convoy" (Drama)
	5:00	Movie - "The Black Glove" (Mystery)
	6:50	Community Bulletin Board
	6:55	Theta News Update
	7:00	Governor's Press Conference
	7:30	Window On Washington
	8:00	Your Federal Income Tax
	8:30	Their Game Is Golf
	9:00	Theta News Update
	9:05	Movies For Swingers: "Devil At My Heels" (C) (Drama)
	10:30	Movie - "Sins Of Jezebel" (Adventure)
	midnight 12:00	Movie - "Banjo On My Knee" (Drama)
	am 1:30	Movie - "Home Sweet Homicide" (Mystery)
Tuesday PM	pm 2:00	Movie - "Home Sweet Homicide" (Mystery)
	3:30	Movie - "The Fabulous Dorseys" (Musical)
	5:00	Movie - "The Convoy" (Drama)
	6:30	Learn To Draw With Bruce McIntyre
	6:50	Community Bulletin Board
	6:55	Theta News Update
	7:00	Science Game
	7:30	Opera - "L' Elisir D' Amore"
	9:30	Theta News Update
	9:35	Movies For Swingers: "Devil At My Heels" (C) (Drama)
	11:00	Movie - "The Black Glove" (Mystery)
	am 12:30	Movie - "Sins Of Jezebel" (Adventure)
Wednesday PM	pm 2:00	Movie - "Banjo On My Knee" (Drama)
	3:30	Movie - "Home Sweet Homicide" (Mystery)
	5:00	Movie - "The Fabulous Dorseys" (Musical)
	6:50	Community Bulletin Board
	6:55	Theta News Update
	7:00	Window On Washington
	7:30	College Baseball: Santa Monica vs. Los Angeles
	9:25	Theta News Update
	9:30	Movies For Swingers: "Devil At My Heels" (C) (Drama)
	11:00	Movie - "The Convoy" (Drama)
	pm 12:30	Movie - "The Black Glove" (Mystery)
Thursday PM	pm 2:00	Movie - "Sins Of Jezebel" (Adventure)
	3:30	Movie - "Banjo On My Knee" (Drama)
	5:00	Movie - "Home Sweet Homicide" (Mystery)
	6:30	Learn To Draw With Bruce McIntyre
	6:50	Community Bulletin Board
	6:55	Theta News Update
	7:00	Mastery Of Light - Lasers
	7:30	Girls' Track: Santa Monica High vs. Beverly Hills
	9:00	Theta News Update
	9:05	Movies For Swingers: "Devil At My Heels" (C) (Drama)
	10:30	Movie - "The Fabulous Dorseys" (Musical)
	midnight 12:00	Movie - "The Convoy" (Drama)
	am 1:30	Movie - "The Black Glove" (Mystery)

The schedule for the large system shows a preponderance of movies, indicating at least the financial ability to acquire the rights to those films. Intermingled with the films are some locally oriented programs (e.g., "Community Bulletin Board," "The Community Speakers") and some that are more general in nature ("Window on Washington," "World Affairs Council").

It is far too early to tell whether either of these systems (or others throughout the country) achieves the full potential intended by the FCC and the various franchising authorities. Local origination is still a relatively new service on a relatively small percentage of cable systems. Its evolution will be influenced greatly by the objectives established in the major market systems yet to be franchised, and here those communities can affect the nature of that evolution.

To do this requires at least two things: an organization structured to develop and produce programs of local community interest, and a commitment of sufficient funds to permit such production to take place.

While some cable operators are exercising considerable creativity in developing local programming, their objectives do not always coincide with those of the franchising authority. Consequently, many recent franchises have attempted to spell out in some detail the franchisee's obligations toward origination cablecasting. It is noted that under FCC rules, a city cannot directly assume responsibility or control of programming on the origination channel, but it can greatly influence the direction such programming takes.

One illustration is the case of Boulder, Colorado,[1] which recently conducted franchise proceedings. In its franchise ordinance, the following extracts indicate the city's position on local origination.

> (Section 8.2) ... The emphasis for this channel shall be on providing high-quality programming that is unavailable to Boulder viewers on broadcast television channels....
> (Section 8.13) ... At least 50 per cent of such programming (on the local origination channel) shall be locally produced....
> (Section 9.7) ... The Grantee shall design the system to permit the isolation of "interest subcommunities" scattered throughout the system....
> (Sections 10.1 and 10.2) ... Require a local non-profit corporation, with its Board of Directors appointed by the city, to be given, at no cost, 10 per cent of the ownership of the cable system's local operating corporation. Funds received shall be utilized for supporting community programming and improving services.

The requirement for participation by the local nonprofit corporation is a device to guarantee continuing community involvement, and at least some influence on what programming is produced.

Whether this is the best way to achieve the objectives remains yet to be tested. Certainly, the fact that the board of directors is appointed by the city may be interpreted as an attempt to exercise direct city control, and as such, may not be acceptable to the FCC.

Costs of Local Origination Cablecasting

The costs of local origination cablecasting fall into two categories:

— Cablecasting equipment and facilities (hardware)
— Program production (software)

Both hardware and software costs can vary widely, depending upon the scope, quality, and degree of professionalism desired. In hardware, studio facilities can range from the equivalent of a high school television laboratory course to the peer of large, network broadcasting studios costing hundreds of thousands of dollars.

Figure 4 presents typical costs of small, medium, and large cablecasting studio facilities. In its recent analysis of cable options for the City of Jacksonville, Florida,[2] the Cable Television Information Center assumed capital costs of $150,000 for a central color, origination studio, which would place it in the medium-large category of Figure 4. Smaller access studios, capable only of monochrome cablecasting, were estimated to carry capital costs of $25,000.

For these two cases in the Jacksonville study, the respective annual operating costs were estimated at $65,000 and $15,000, considered as modest budgets. The $65,000 estimate would allow the employment of a program director and a small production staff, and would require that almost all programming be produced internally since no funds for acquiring external productions would

[1] Boulder is not typical, since its method of negotiation and some of its objectives depart considerably from conventional practice. A number of the terms agreed to in the franchise also appear to violate FCC rules, and will require waivers.

[2] "Cable Television: Options for Jacksonville," Cable Television Information Center, March 1973.

Figure 4. Typical Capital Costs – Cablecasting Studio Equipment

Small	Medium	Large
(2) Video cameras (monochrome)	(2) Video cameras (color)	(3) Video cameras (color)
(1) Video tape recorder (monochrome)	(2) Video tape recorders (color)	(3) Video tape recorders (color)
(1) Video switcher	(1) Video switcher	(1) Video switcher
(1) Audio mixer	(1) Audio mixer	(1) Audio mixer
(1) Film chain (monochrome)	(1) Film chain (color)	(1) Film chain (color)
(1) Control console, with monitors	(1) Control console, with monitors	(1) Control console, with monitors
(1) Set of cables, microphones, tripod, dolly, pedestal	(1) Set of cables, microphones, tripod, dolly, pedestal	(1) Set of cables, microphones, tripod, dolly, pedestal
(1) Lighting package	(1) Lighting package	(1) Lighting package
		(1) Mobile cablecasting van and equipment
$25,000 to $40,000	$60,000 to $100,000	$150,000 to $200,000

be available. The $15,000 access studio budget allows only for studio maintenance and minor assistance to the users of the studio who would be required to bear all other production costs.

Software costs also can range over a wide spectrum. A live studio interview of a local personality, for example, would involve only the cost of attendant personnel and the equipment operating charges for a half-hour or an hour, totaling perhaps $100 to $300. Cablecasting productions from remote locations, as, for instance, TelePrompTer did for the opera "Le Coq D'or," carries a cost of many thousands of dollars, even excluding royalty fees. At the upper end of the range is the professional production of original dramatic or documentary material with written scripts, actors, scenery, location shots, special effects, etc. This can easily cost a minimum of $1,000 per viewing minute, with almost no upper limit.

Thus, programming a local origination channel is in many respects similar to programming a broadcast television station, and the costs do not differ substantially for operations of equivalent size.

A critical issue for the system operator is what level or program quality is necessary to attract viewers, and particularly additional subscribers. If entertainment alone is offered, cablecasting must compete with other entertainment media such as broadcast TV and films. Subprofessional quality may not be tolerated by viewers used to professionalism in production at least, if not in content.

If, on the other hand, subjects of special local interest are presented, the cable viewers may accept a lower cost production. Ethnic programming or programs dealing with controversial community issues, for example, may receive such acceptance.

Policy Considerations

The local origination channel provides perhaps the best test of the ability of the community and the cable operator to arrive at a mutually beneficial meeting of minds. The channel is the operator's responsibility but the FCC has clearly indicated that the operator must be attuned and responsive to local community interests and needs.

Some of these needs and their related commitments can be incorporated into the franchise process. Others will evolve after the franchise has been granted.

Policy considerations to be determined by the franchising authority must address questions such as:

Program balance
What proportion of programs should be either locally produced or devoted to local topics?

Local production facilities
What minimum level of production and cablecasting facilities must the franchisee furnish? Should access to these facilities be shared with others?

Community participation
Should there be a formal structure to permit the community to participate in local origination, as, for example, in Boulder? How can funds for programming best be assured? Can existing institutions such as schools, libraries, etc., provide resources?

Program distribution
Are there sufficiently varied population groups, either ethnically or otherwise, to warrant subdistricting and specialized programming for each group or geographic area?

In each of these areas, the limited and sometimes ambiguous regulatory role explicitly assumed by the FCC permits a wide degree of discretion by local authorities. Some local authorities will prefer to define precise commitments as part of the franchise, while others will depend upon negotiation to achieve their objectives.

No single approach appears best for all communities. However, a high degree of local concern and effort is warranted, since the local origination channel is potentially a powerful community communications medium.

PUBLIC ACCESS

Cablecasting

Perhaps even more than the local origination channel, the public access channel represents both a challenging opportunity and a problem. The FCC has, in effect, provided a free forum for anyone in the community to use the medium of cable to communicate with an audience. This has no parallel in commercial broadcasting. In the print media, the closest similarity might be a "letters to the editor" column in a newspaper, but without the constraint of providing space for only a few letters.

The public access channel, for the first time, guarantees the right of community participation at the individual level, even by individuals without organizational ties or portfolio. The range of possible programming is limited only by production costs. Thus, a wider spectrum of subjects than on any other cable channel is possible.

Because it is a new concept, which may lead to uncertain results, the concern of franchising authorities is how to gain some reasonable assurance that the public access channel will, in the main, lead to public benefits. This concern, however, may conflict with the FCC rules that prohibit interference with program content on this channel.

The specific FCC requirements are:

1. Each new major market system shall provide (at no cost) and maintain "at least one specially designated, noncommercial public access channel available on a first-come, nondiscriminatory basis."
2. The system shall also provide "minimal equipment and facilities necessary for the production of programming for such a channel." There is no restriction that prevents using local origination facilities for public access programming, in addition. There is also no definition of what "minimal" means in terms of how many access locations are adequate and what equipment should be provided at each location.
3. The system shall exercise no control over program content except that necessary to establish rules ensuring compliance with the prohibition on lotteries and obscenity. Commercial advertising is also banned on this channel.
4. The system operator may make no charge for the use of production facilities for up to five minutes. Above five minutes, production costs may be assessed "consistent with the goal of affording the public a low-cost means of television access." If a program is produced externally (e.g., videotaped in the field), there is no charge for cablecasting regardless of program length. For longer programs produced at the system's cablecasting studio, a half-hour program easily can cost several hundred dollars or more, depending upon the facilities used.

In contrast to the local origination channel over which the system operator has full programming control, the operator only administers the public access channel. Program content is the sole responsibility of the individual or group presenting the program. The local authority, under current interpretation of the FCC's rules, can neither control nor influence programming.

Only a handful of cities have had any experience with a public access channel to date, with New York being perhaps the outstanding example. It should be noted, however, that New York's public

access channels began operation prior to adoption of the new FCC rules and, being "grandfathered,"[1] are not presently required to conform to the rules.

In New York, the public access channels have been used extensively, and are perhaps busier than local origination channels for most cable systems. Two channels, in fact, are devoted to public access with one featuring programs on a scheduled basis, and the other for "walk-in," first-come, first-served cablecasting.

Proper use of public access channel facilities necessitates training individuals and groups in video techniques to achieve at least a minimal competence in program production. Some of this training is now available both from cable operator and other communications-oriented organizations.

For example, both New York cable systems have contributed facilities and funds in the furthering of public access cablecasting. TelePrompTer has opened a storefront studio in Harlem, the first of several such facilities planned for community use. Sterling Manhattan Cable TV is providing and maintaining video equipment and tape for a free video workshop. The workshop, in Greenwich Village, is sponsored by New York University's School of the Arts, assisted by a grant from the Fund for the City of New York. The School's Alternate Media Center staffs the workshop. Previous funding to the Alternate Media Center by the Markle Foundation established facilities for public access training in New Jersey, Pennsylvania, and Indiana.

Also assisting in training for use of the public access channels are several organizations specifically organized for that purpose. Typical is Open Channel, Inc., a non-profit organization which conducts classes in program production and the proper use of low cost, 1/2-inch video recording equipment. Workshops include instruction in single and multiple camera techniques, lighting, audio, tape editing, etc.

The programs that have appeared on New York's public access channels to date vary widely, from artistic groups and ethnic organizations to individuals admittedly cablecasting for their own pleasure. Some programs are foundation or church sponsored, others are made possible through volunteer labor and free facilities, courtesy of the cable operators.

Whether the volume of programming is matched by benefits to the community is difficult to evaluate, at least up to the present time.

Some programs have been unabashedly self-expressive, even exhibitionist — of interest to and viewed by friends of the producer and few others. Others, as for example a series of programs in sign language for the deaf, have served a specific purpose of great value to a target audience, a service that had not been provided on other electronic media.

All in all, the New York experience has been valuable as a pioneering effort that can guide other communities. Whether the 1972 FCC rules will bring forth public access channel use in major markets whose results differ markedly from those in New York remains to be seen.

As one example of the direction taken, the cable system serving Berkeley, California, has issued operating guidelines for use of its public access channel that do conform to the commission's *Third Report and Order*.

These consist of eight rules, the first six of which enumerate the FCC's mandates as discussed previously. The last two address operating considerations, indicating that:

— The cable operator will attempt to accommodate a users' requested date and time for program scheduling, and require an application 10 days prior to that date.

— "All appropriate arrangements and clearances must have been obtained from broadcast stations, ... as may be necessary for authorization to transmit its program material over the facilities of Bay Cablevision."

The application then includes the following statement to be signed by the potential access channel user whereby the user accepts responsibility for his production:

> I have read and understand the rules applicable to Bay Cablevision Access Services. Presentations must not contain matter that is commercial, libelous, slanderous or obscene, and may not be in support of a candidate for public office. I hereby consent to the use of my name, likeness, pictures, and/or voice by you, and your licensees for cablecasting, direct exhibition, and subsidary purposes. I expressly release Bay Cablevision, ..., from any claim, known, and unknown, arising out of, or in any way connected with the cablecast of said program, its content or exposure. I agree to be fully responsible for my own participation in said program and indemnify and hold Bay Cablevision harmless for any liability, loss, or expense arising therefrom.

[1]Systems that are "grandfathered" are not required to comply until March 31, 1977.

Technical Problems

Some serious technical problems have arisen in the use of the public access channel. For those who cablecast from the cable system studio, reception is generally good. But many users produce their programs on videotape outside the cable system, and bring the tape to the studio for playback. A popular videotape recorder for this purpose is the small, inexpensive, 1/2-inch model manufactured by several Japanese companies. A typical unit, such as the Sony Portapak, with a monochrome video camera, costs about $1,500, is battery-operated and portable enough to be carried by one person.

With such equipment, the cost of producing a program can be very low. A one-hour videotape reel or cassette costs $30 to $60, and can be erased and reused after playback. If voluntary, unpaid labor is used, the total production costs are within the reach of almost anyone. For more elaborate productions, of course, the cost can parallel those of programs on the local origination channel.

The tape produced by these low-cost recorders, however, in many cases cannot be played back directly into the cable system without resulting in poor reception on many TV sets. Their "time base stability" (the feature that permits proper synchronization with TV receiver display) is poor, and becomes more erratic with continued use of the recorder. As a result, the picture on the subscriber's screen may "tear," or, in extreme cases, be completely indecipherable. In either case, viewers can be driven away unless their interest is extremely high.

One method of salvaging the poorer quality tapes is for the cable system operator to play them through time base stability corrector equipment which, in effect, reconstructs their synchronization ability and makes them viewable. Equipment to improve the time base stability of video from inexpensive tape machines has been advertised for almost $5,000. The cable operator needs only one such device on line to process all playbacks.

Alternatively, some cable operators have established minimum technical standards for externally prepared videotapes. Their right to do so under the FCC's regulations may be questioned, but no serious objections have been raised.

Other solutions appear less promising. There is little likelihood of improving the performance of the 1/2-inch videotape equipment without drastic price increases. This would in turn reduce the accessibility to many who wish to use the access channel, and defeat the prime purpose of public access.

Policy Considerations

Establishing a clear-cut policy for a franchising authority on public access is a thorny task. The FCC has taken a strong position that neither local governments nor the cable operators shall exercise any control over programming. This may be necessary to preserve the independence of the public access concept, but in practice both the localities and the operators become involved, notwithstanding the rules. The resulting furor from the alleged "obscene" tape shown in New York City was directed at the operator and the city, and both were expected to take action, although what they could do was difficult to determine. As a result of that case, the National Cable Television Association recommended that operators "prescreen" public access tapes, but this is hardly a complete solution. First, there will be inevitable differences of opinion between operators and channel users as to whether a program is, in fact, obscene, with the issue of prior censorship being raised. Secondly, there is no equivalent prescreening protection for live programs.

The franchising authority's potential role is fraught with even more difficulty. In addition to the censorship question in obscenity issues, there is the strong suspicion that any attempt at influence or control will lead eventually to political censorship, or at the least, the inhibition of "anti-establishment" programs.

Some localities are wary of the political implications of public access, with anyone having the right to criticize the local political leaders and administration. This right, however, is exactly what the FCC appears determined to preserve.

Similarly, many operators are concerned that the public access channel is in effect a competitor of the local origination channel for a share of the cable audience. Since they often spend substantial amounts of money for programming and promoting the origination channel, they would prefer that any public access programs which generate viewer interest would be available on the origination channel instead, where more direct benefits might ensue.

Regardless of these qualms, the prevailing opinion seems to be that public access, properly organized and used, can become a stimulating and provocative communications medium. How to ensure that this happens is a major objective of many franchising authorities.

This objective requires policy decisions in the areas of:

Organization

How can a structure best be organized to help

program and administer the public access channel, without domination or undue influence by either local authorities or the cable operator?

Funding

What is the best way to ensure that sufficient funding is available for public access programming to encourage experimentation and development?

Many cities are approaching the organizational problem by establishing public access advisory committees or boards, made up of sufficiently diverse representatives of the community to ensure that a variety of viewpoints are included. While this is perhaps the most feasible approach, the question of whether such boards simply perpetuate the "establishment", (since the members are usually appointed by the city) remains to be answered. Also, the FCC has placed the responsibility on the cable operator for establishing operating rules for the public access channel, and whether this can be delegated without objection remains to be indicated. If this is possible, it appears that operators, with a few exceptions, would as soon be relieved of the responsibility. Funding, as usual, is a more difficult problem. Thus far, various foundations and governmental agencies have supported public access experimentation. Such support is sporadic and cannot be relied upon for long-term program planning and development.

One approach by some cities has been to assume that a portion of cable system revenues should be plowed back into public access programming. This, in effect, reduces the income to the cable operators and naturally is opposed by many in the cable industry who claim that if public benefits are achieved the public should be willing to foot the bill. The FCC's rules also appear to lean in this direction, since the only provision made for funds available to local governments is the allowable three to five per cent of subscriber gross revenues.

Nevertheless, cities are testing this restriction, even if it requires waiver application. The Boulder franchise, previously cited, provides the following conditions for public access:

> (Section 11) — (Establishes a Boulder Citizens Forum)
>
> (Section 11.1) — It is the intent of the Grantor to ensure that the Public Access channel is governed by a strong and independent group of citizens such that the channel may be free of censorship, open to all residents of Boulder and the Service Area, available for information and cultural programming of all kinds, and available at all times for uninhibited, robust, and wide-open debate on public issues.
>
> (Section 11.2) — There is hereby established an entity, to be known as the Boulder Citizens Forum...
>
> (Section 11.3) — The Forum shall be governed by a group of Directors consisting of five members who shall serve without remuneration of any kind.
>
> (Section 11.4) — The Directors shall be appointed by the Grantor. The Grantor shall endeavor, in its appointments, to achieve a broad representation of the diverse population of the City and Service Area. Age, sex, race, professional status, income group, student status, minority group status, leadership ability, demonstrated interest in community affairs, and other relevant criteria shall all be considered by the Grantor when making appointments. Under no circumstances shall all of the Directors be of the same sex or representatives of a single socio-economic class....
>
> (Section 7.2) — In consideration of the tremendous opportunity for community expression and service provided by the Public Access channel, and in recognition of the need to provide a measure of financial independence for that channel, the Grantee shall pay into an account established (for) the Boulder Citizens Forum, ..., an annual amount equal to 2 per cent of the Grantee's annual subscriber revenues....

In addition to these requirements, the forum is permitted and encouraged to seek financial support from federal, state and private agencies, and also from the citizens of Boulder. An initial funding of $10,000 for 1974 and $5,000 for 1975 has been approved by the city to get the forum started, and the city council has promised to consider future requests for additional support when they arise. Furthermore, city services such as purchasing, accounting, payroll preparation, employee health insurance, etc., are also available to the forum.

Such a formal structure certainly will enable a more coordinated and efficient effort to be made in public access programming. Whether this effort truly can remain free of influence and open to all of the public on an equal basis remains to be seen.

The amount of money available under this approach is also of interest. The grantee in the case of Boulder (TelePrompTer) projects subscriber revenues as about $280,000 in 1974, rising

to $1,680,000 by 1982. Thus the 2 per cent fee for public access programming would be a low of $5,600 in 1974, increasing to a maximum of $33,600 in 1982. While these sums are not insignificant, even a staff of one or two permanent production people would deplete a major portion of the funds. Consequently, only a very modest programming effort could be sustained unless other funds became available. Furthermore, even the above allotments are based on grantee estimates of revenue which may be high. There is a provision for future renegotiation on the basis of actual revenue and these, if substantially lower than estimated, might further reduce programming support.

These considerations indicate that the overriding problem of funding public access programming still remains to be solved on any stable, long-term basis.

EDUCATIONAL ACCESS

Cablecasting

The potential that cable holds for improving education and vocational training has been a subject of great interest to educators. Many of them believe that a well designed telecommunications system can reduce instructional cost and provide a degree of educational flexibility and convenience not otherwise possible.

Obviously, if the content of an instructional TV program is poor, students will not learn as easily or quickly as desired. If, however, the content is good, the program can be distributed more widely and at lower cost via telecommunications than most other alternatives. It can also provide valuable supplementary support to instructors, reducing the teaching burden.

A cable network, as a broadband telecommunications delivery system, can offer the ability to deliver a variety of educational programming to schools and to subscribers. It can be a distribution "highway" among all schools, capable of carrying almost any kind of educational or instructional material, and it also can reach much of the non-school public.

The kinds of educational services possible via cable include:

— Audio-visual, TV format programs from live, tape, or film sources (either one-way or interactive)

— Data communications between computer terminals, linking a computer to classrooms for computer assisted instruction

— Graphical and/or text material from data "banks," either in temporary form to be displayed on cathode ray tube devices, or in permanent hard copy form using printers or facsimile reproduction terminal.

These services can be applied both to in-school curricula and to many forms of education and training not offered within traditional educational institutions. The latter include:

— Pre-kindergarten education
— High school equivalency programs
— Adult education and extension courses
— Vocational and paraprofessional training
— "Open University" courses.

This broad range of possibilities has drawn attention to cable as an attractive means of translating the possibilities into reality. As a result, there has been more activity in exploring and developing the applications of cable to education at the community level than perhaps in any other area of public service communications.

The FCC, recognizing this potential, has required that new, major market cable systems provide an educational access channel. Specifically, it is required that:

1. The system "shall maintain at least one specially designated channel for use by local educational authorities."

2. The channel shall be provided without cost to users for a period of five years after completion of the system's basic trunk line(s). After this five year period, the commission presumably will review the question of channel charges, and determine whether continuing no-cost operation is justified.

The FCC has not specified which educational agency, if any, shall control scheduling and programming for the channel, nor does it suggest any allocation among, for example, primary, secondary, and higher educational institutions, or even between public and parochial schools. Presumably, the channel is available for any legitimate educational use, either on a negotiated or first-come, first-served basis.

This may lead to many areas of disagreement. If a public school and a community college each wish to cablecast an instructional course at 11 A M, who determines which gets priority? At present, it is either the cable operator or some form of joint administrative committee set up by the educational agencies themselves. This certainly is an area in which local authorities might encourage creation of an administrative structure that includes all of the educational community.

The educational channel provided by the FCC mandate can be used in a variety of ways. One convenient grouping is in terms of whether the programming is distributed on a "closed circuit" or "open circuit" basis.

"Closed circuit" or private channel applications are those in which only selected segments of the cable audience can receive the cablecast programs. For example, certain programs may be restricted for reception only by the schools, and not individual cable system subscribers. This can be accomplished by using a special channel frequency or a scrambled signal and supplying only the schools with the converter which can accept that signal.

There are many cases in which educators prefer closed circuit operation. For example, an instructional TV program in mathematics might be prepared at one school (or purchased from an outside source). The ability to transmit this program to other schools, at a time convenient to individual classroom schedules, would both save money and extend high quality instruction simultaneously to a number of classes. It is possible, of course, to accomplish the same objective by physically transporting a tape or film to each school. But the instantaneous communications ability of the cable is more attractive and, in many cases, more economical.

While there is nothing particularly secret about such instructional TV programs, some educators dislike the concept of "working in a fishbowl." The idea of cable subscribers being able to watch in-school instruction is not usually considered an advantage, except in special cases. Consequently, an open educational channel poses some operational inhibitions.

"Open circuit" applications are those in which the program material is transmitted over the standard channel frequency allocated to the educational channel and can be received by anyone connected to the cable system.

A key problem in delivering educational services over the cable to subscribers' homes is whether or not the subscribers represent the desired target audience to a sufficient extent. As an example, if high school equivalency courses are shown, presumably the target audience would be non-high school graduates. Most of those in this category might also be at a lower economic level, unable to subscribe to the cable. (This is true of many public communications services, such as health care, fire and burglar alarm, etc., in which the portion of the population that needs the service most probably would not be subscribers.)

One possible approach that franchising authorities can consider is the establishment of community information centers at convenient points which would permit non-subscribers to gather and receive at least the public services programming offered by the cable system. This would alleviate the mismatch between programs and the intended audience.

The public libraries, in particular, would seem to be well suited to this function. Many have meeting or audience rooms already available, and have in recent years acquired considerable experience in audio-visual equipment and techniques.

The following examples illustrate both closed circuit and open circuit educational applications already being carried out via cable.

Examples of closed circuit applications include:

- The Louisiana Hospital TV Network connects 17 health delivery organizations throughout the state. Programming for the continuing professional education of doctors and nurses is connected into a local cable system in Monroe, Louisiana, on a private channel. About 125 physicians in the area, eligible to view the programs, are provided with a converter that can tune in the channel frequency.
- "Private" educational channels allocated only to inter-school programs are required in the cable system for Anaheim, California.
- Adult extension courses, for a fee, are being planned by several universities in conjunction with local cable systems. Scrambled signals would be used, restricting access only to subscribers paying the fee for each course.

Open circuit educational examples include:

- Oregon State University programs a Liberty TV cable channel between 20-40 hours a week. It is estimated that as many as 60 per cent of the students enrolled watch some courses off campus.
- Pace College in New York offers 26 half-hour lectures on art appreciation, cablecast in color on a TelePrompTer cable channel. This is an open channel, but viewers who wish to earn college credit for the course can do so by turning in term papers on the subjects covered, and by paying the college fee.
- The University of Oregon's communications department has programmed a video channel carried on the Eugene-Springfield cable system for the past seven years.
- Continental Cablevision's system in Sault Ste. Marie, Ontario, Canada, carried 10 hours of educational programming a day, aimed at adults seeking informal post-secondary education.

• Antietam Cable, in Hagerstown, Maryland, has concluded an agreement with the county board of education, providing access to the cable system's subscribers for the delivery of a variety of educational programs.

From an information delivery perspective, these applications have demonstrated the ability to reach sizeable audiences. What must be considered in addition, however, are the comparative costs of using cable rather than other media.

Costs of Educational Cablecasting

The educational channel offers many opportunities for improving the current teaching/learning process. At the same time, cablecasting for education presents a major challenge in terms of achieving educational objectives at reasonable cost.

Hardware costs for educational access are no different from those of origination or public access. Educational institutions can either share the use of the cable system's facilities or, if funds are available, establish one or more conveniently located studios dedicated solely to educational use, connected by cable or microwave into the cable system's headend.

For those wishing to produce educational programs locally, the gamut again can range from a simple video version of a classroom lecture costing from $50 to $200 per hour to more elaborate programs utilizing a variety of audio/visual aids, to learning such as animation, location shots, diagrams, etc. As an example at the upper end, a recent series of educational films depicting the architectural and cultural history of Mexico, and produced on location, cost over $300,000.

The total cost of a television based educational facility includes three components:

— Initial equipment cost
— Operating costs
— Program production or acquisition costs.

Equipment costs depend upon the degree to which the cable system's studio and production facilities are shared by the educational institutions. At one extreme, if the cable system's facilities are adequate and available for sufficient time to conduct all educational cablecasting and produce all educational programming, the added capital investment required by the educational users will be negligible. At the other extreme, if completely separate studio and production facilities are required, the capital cost will be the same as shown in Figure 4. In many communities, video equipment and studios are already available either on the premises of an educational TV broadcasting station or at local colleges or universities that offer courses in communications. These can often be shared, on a cost-reimbursable basis, by other educational users such as the elementary and high schools and, possibly, parochial schools.

As for the case of local origination, the cost of programming is a much more uncertain variable. Many educational programs and courses in film or videotape formats are already available for purchase or rental. The Great Plains National Instructional TV Library, a division of the University of Nebraska, for example, has a wide range of titles for sale. If any of this material met the requirements of a particular school district, the acquisition cost would be a fraction of that necessary to develop new programs.

The available repertory is limited, however, and many educational institutions will wish to produce their own programming, for certain courses at least. Here, again, the range of costs can be substantial. At the low end, producing a videotape of an instructor seated at his desk essentially giving a classroom lecture can cost $100 to $500 per hour. At the high extreme, "Sesame Street's" initial budget, for example, was in the order of $8,000,000.

Many communities have some existing program production facilities, either at a local educational TV station or at a nearby college or university, that offer academic and laboratory courses in film and video techniques. Such facilities normally are limited to the production of courses compatible with standard TV format (e.g., they are not capable of preparing computer assisted instruction courses). But within that limitation the equipment may be completely adequate. The rental of existing facilities offers a substantial cost saving compared to the construction of new studios for cablecasting.

As a typical example, Pasadena City College, in the Los Angeles metropolitan area, maintains a television production studio for its own curriculum. When not in scheduled use by students, the facilities are available at the following rates:

Cost per hour—black & white facilities	$275.00
Cost per hour—color facilities	$575.00

These costs include the use of video cameras, tape recorders, "normal" studio facilities such as lights, existing sets, and operating technical personnel. Special requirements for script writing, set design and construction, dubbing, etc., are negotiated separately.

Figure 5 provides some general cost ranges for either acquisition or development of educational

Figure 5. Cost Ranges for Educational Software

Item	Cost (Approximate)
Acquisition of instructional TV library (tape, film)	Small $ 50,000 Medium 150,000 Large 500,000
Development of local instructional TV courses	$500 per hour to $50,000 per hour depending on quality of production, sets, animations, etc.
Addition of talk-back feature*	$25,000 plus $500 per talk-back terminal
Acquisition of computer facility* (hardware & basic software)	$100,000 to $2,000,000 plus $1,500 to $5,000 per computer terminal
Acquisition of existing CAI library*	Small $ 150,000
Development of CAI courses*	$20,000 to $100,000 per course
Acquisition of dial-access multi-media retrieval system	$500,000 to $1,500,000
Development of data-bank information retrieval system*	$1,000,000 to $10,000,000

*Requires two-way cable system

programming. In some cases, two-way cable systems, described later, are required.

Certainly, the total costs, hardware and software, for using cable as a formal educational vehicle, can be high. The key question is whether these high costs can be justified.

A comprehensive answer must await more data resulting from actual cable system use. Two hypothetical illustrations, however, may indicate the relationships involved.

In the first illustration, assume:

1. An instructional TV course (one-way) is given three hours per week for the school year (40 weeks) for a total of 120 hours. It is viewed at 50 schools via cable connections.
2. During the time the course is shown on school TV receivers, two classes can be combined in one larger viewing room with only one instructor. This is a reasonable assumption since, during the viewing, no direct instruction will take place.
3. This is a saving of 6,000 instructor hours, or at $5 an hour, a cost saving of $30,000.
4. If this course could be repeated for three school years, the total saving would be $90,000.

Obviously, this example is oversimplified and subject to some qualification. It does indicate, however, only one of many substantial cost savings over present techniques.

Furthermore, in certain special courses where the shortage of qualified instructors is severe, it may be the only practical way of providing education in those subjects.

In the second illustration, assume:

1. An educational system of 80 schools, 1200 classrooms, and 30,000 students within the cable franchise limits.
2. Costs include in-school wiring and a TV receiver in each classroom (deduct if already available).
3. Programming to fill one cable channel through each school day (6-8 hours), with material at the elementary school level only.

With these assumptions, the following are considered reasonable cost estimates:

Initial equipment	$ 70,000
Initial program library (purchase)	70,000
TV receiver + school wiring	360,000
Total initial cost	$500,000
Cost per year (5-yr. amortization)	100,000
Annual operating expenses (incl. program production)	260,000
Total cost per year	$360,000
Cost/Year/Student	$ 12.00

It can be seen that although the total costs are substantial, the cost per student is reasonably low,

about $1.00 per month. (This figure can be reduced even further if the same courses can be repeated a number of times.) If the program material does an adequate educational job, the cable distribution technique certainly is cost effective compared to other alternatives.

It behooves each community, then, to take advantage of the educational channel. This requires setting up a system and organizational structure for managing both the use of the channel and the facilities and staff that produce the programs.

Policy Considerations

A basic problem in establishing policy for the use of educational cable channels is that in many areas the municipal government does not necessarily include jurisdiction over all school facilities within its boundaries. In some cases, school districts overlap city/county boundaries, resulting in many schools outside a particular franchised cable area. Primary, secondary, and college level educational institutions are subject to different administration, with the latter more usually under state control rather than local control. Finally, education also includes non-governmental aspects, such as private and parochial schools, vocational centers, etc.

It is therefore not usually possible for a city, simply by fiat, to assume authority to structure and control the use of the educational channel. This must be accomplished, rather, by negotiation and joint agreement among all parties concerned. Here, the city can take the lead in stimulating progress.

The major policy considerations include:

Administration of the educational channel
How can administrative structure be established to include all legitimate educational viewpoints, giving appropriate weight to each? What are the most desirable operating procedures?

Facilities
Are there existing community facilities at a local educational TV station or college that can be shared? Can the cable operator's facilities and staff be used? How can costs be shared?

Funding of educational programming
Are current educational budgets adequate for cable programming? Can funds be transferred from existing delivery systems? How can the differences in public and parochial school funding be resolved? What organizational realignments are necessary? Which programs can recover costs from subscribers?

Manpower training
What new skills and training are required? How will these be acquired?

Expansion of educational applications
Who will be responsible for planning and developing new applications, e.g., adult enrichment courses, career education, pre-school programming, vocational training, etc.?

One option might be for a franchising authority to establish a management board or commission similar in concept to those discussed for public access. This might be composed, for example of representatives of the local school district, any colleges or universities in the area, and parochial and private schools. The board would be empowered to establish schedules for use of the cable channel, and perhaps also to raise funds for and coordinate the production of programs.

A looser administration is also possible. Each educational group could be allocated specific time slots for use of the channel, with all other responsibility resting within the groups themselves. Since each presumably has an educational budget, it could determine independently what portion of what budget to commit to cablecasting.

Still a third option is a hybrid of the first two. Equipment and facilities could be centralized — as in a single cablecasting studio and program production center — and shared by all educational sectors. This would save some funds by avoiding duplication. Programming, however, might be left to the individual effort of each group.

No single option is best for all communities since the choice depends upon how many different kinds of schools there are, their location, budget priorities, and their view of the utility of cable to meet specific educational needs.

LOCAL GOVERNMENT ACCESS

Cablecasting

It is somewhat of an irony that of all the access channels, the one designated for the use of local government is the most completely available for unrestricted use by the franchising cities and counties, and yet the least used. If local administrations and governmental agencies cannot efficiently use the channel given to them it is not a promising sign in terms of any attempt to plan for integrated use of the entire cable system.

The FCC's requirements for a local government access channel are similar to those of the educational channel:

— "At least one specially designated channel for local government use"

— Availability at no cost to the user for the first five years.

Thus far, relatively little use has been made of a separate government channel. In part, this is due to the fact that most systems affected by the *Third Report and Order* have yet to be constructed. Older systems do carry local government events (e.g., the ubiquitous city council meetings). But, usually they appear on the local origination channel as a presentation by the cable operator rather than by the government itself. Since, in many cases, the operator would be happy to continue cablecasting these events, as requested by the local government, one logical question is whether the independent governmental channel is necessary at all.

The answer will depend upon how active a role each local government wishes to play in communicating both to the public and, internally, among its agencies. As in the educational case, there will be open circuit applications in which communication to the general public is desired and also closed circuit uses which are essentially private communications.

For open circuit applications, one possibility is to continue the use of the local origination channel and its facilities and staff with the government, perhaps reimbursing costs above some level of usage. This may suffice for some period of time.

It appears wise, however, to prepare for expanded use of the governmental channel. If the government truly wishes to inform its citizenry of what is happening within the administration and also to send special information to selected groups (e.g., training and job information to the young, health and social service information to the aged), it must build up the audience that is prepared to view and absorb such programming. As with any communications medium, this takes considerable time.

Closed circuit applications are equally important. Many cable systems already provide special facilities to local government, such as closed circuit links among public agencies — libraries, police and fire stations, hospitals, and so on. The new governmental channel can be used on a private (one-way) basis so that messages and special programs can be sent to each of these agencies. Again, a special converter can grant access only to those authorized for reception.

Closed circuit examples include:

- In Wilmington, Delaware, the fire department videotapes actual fire fighting operations, then replays them via cable to the fire station. The tapes allow the firemen to see themselves in action and to review their performance, thus improving their training.
- In Sunnyvale, California, the cable system production facilities are used to create orientation programs for new city employees. These are played back over a closed circuit channel.

Many other potential closed circuit applications require two-way cable systems, described later.

Open circuit applications involve the preparation of programs from the city to the public, or that portion of the public represented by the cable subscribers. Here, programming has not yet occurred to any significant extent. The task of funding, organizing, and staffing a program development effort is difficult because of budgetary restraints, political inertia and also because local government is a number of agencies and departments rather than a unified entity.

A few open circuit applications that have been implemented include:

- Preparation and cablecasting of a series of 15-minute taped programs by the California Department of Public Alertness, providing the public with procedures to follow in the event of natural disasters such as earthquakes or forest fires.
- Several cable systems have emergency alert features in which an alarm or buzzer on any channel is a notification to turn to the city channel for news of an emergency.
- The City of New York operates a television broadcasting station. Many of the films and tapes prepared for this station are now being planned for cable distribution.
- The Los Angeles cable system has cablecast panel discussions of the City Planning Commission with community residents.

If a locality wishes to operate its cable channel on more than an occasional basis, it must, as for the other cablecasting uses discussed, commit the funds and manpower to do so as an ongoing task. The costs will not vary significantly from those outlined for educational or local origination cablecasting.

Several options are open to consideration. One is to establish a single, centralized cablecasting and production facility that can be shared by the governmental and the educational users (and perhaps also public access users). This might be staffed and paid for by the government, with use charges made to others.

A second option is to contract with the cable system operator to provide both facilities and production services, perhaps guaranteeing a minimum annual level of usage.

Still a third option might be to permit each department, such as police, fire, library, etc., to budget and contract for its own programming, using the governmental channel on a scheduled basis.

In all of these options, perhaps the most difficult area to deal with will be program production. The creative talent to produce programs that the target audience actually will watch is not universally available. In assessing the task of programming a local governmental channel, one city manager stated:

> ... probably the greatest immediate challenge we're going to face will be that of creativity. We're going to have to say some old things and some new things in innovative ways. This may mean the hiring of new writers for the city — the hiring of technical experts — people who can work with film — and quite possibly the hiring of full-time producers. If you think that may be a bit farfetched, consider the fact that we're going to have access to our *own* channel, and even if we decide to program only a few hours a week, the amount of time spent in the preparation of those shows can be tremendous.[1]

The choice, in most cases, will be either to contract with production firms that can deliver an interesting product, or develop, at significant expense, such talent within the governmental staff. For large cities, a separate office of telecommunications might be established, as in New York. Under such an office, cable programming responsibility might be assigned. For smaller cities, a group reporting to the city manager or administrative officer might perform the function.

In any event, programming costs, unlike facilities, cannot be shared since these represent the messages the government wishes to convey. These costs can be a significant financial burden.

Policy Considerations

The first question each community must determine is "What are the major needs for governmental communications, both to the public and within the various agencies?" Only after an answer to this question is reached — no matter how preliminary or tentative — can an intelligent decision be made on the best method of operating the governmental channel.

[1]Remarks by Wayne Wedin, City Manager, Brea, California, at the Programming for Cable Television Conference, Berkeley, California, May 5, 1973.

With this as a base, there still remain numerous policy considerations such as:

Channel management

What agency can best operate the channel, including studio facilities and program production? Does a new entity have to be formed to assume one or more of these functions? Is it advantageous to contract for any of these services, either with the cable operator or others?

Funding

What present governmental funds, used for communications, would be more efficiently spent for cable? What new funding is required, and are sources available?

Planning

Who will be responsible for planning new services and programming? Will such planning properly integrate the objectives of all potential user agencies? What liaison is necessary with the cable operator to assure feasibility?

As with other cablecasting functions, the answers will vary from locality to locality and perhaps even from one administration to the next in the same city or county government. Those with pressing communications needs, and/or a greater concern with the potential benefits of telecommunications, will assume a more active role in using the cable.

LEASED ACCESS

Cablecasting

Leased access channels are defined by the FCC as those not used for designated services. In effect, they represent the spare channel capacity available for new services.

As such, they are important to each franchising authority in determining the future course cable may take. They represent a greater degree of uncertainty in the ability to predict how they may be used, but they also hold the greatest potential for change in urban communications.

The FCC's regulations state:

1. Having satisfied the requirement for retransmission services and origination, public access, education, and municipal channels, each system "shall offer other portions of its nonbroadcast bandwidth, including unused portions of the specially designed channels, for leased access services."

2. On at least one leased access channel, priority shall be given to part-time users. Thus, users who wish to cablecast only occasionally or for short blocks of time are guaranteed an outlet.

3. The cable operator cannot exercise program control over leased channels.

Thus, if a 20 channel system carries 10 off-the-air signals, these plus the origination, public access, educational, and government channels would total 14. The remaining six (and also temporarily unused portions of the four access channels) are classified as available for lease.

One other requirement pertains to all access channels, including leased. Whenever all categories of access channels are in use 80 per cent of the weekdays (Monday through Friday) for 80 per cent of the time during any consecutive three hour period for six consecutive weeks, the system is deemed to be sufficiently saturated so that the operator must make a new channel available within six months. This is intended to force system growth to meet user demand.

The FCC specifies no standard rates for leasing channels, nor method of establishing such rates. This, for the time being at least, appears to be an area into which local governments may inquire.

Many possible uses for leased channels are under intensive analysis for technical and economic feasibility. At least four broad categories are considered likely: pay cable; advertiser supported services (e.g., time leased by a local department store); public services supported by governmental payment or subsidy (e.g., additional channels for education or local governmental use); and the lease of a complete channel for either nonprofit or commercial purpose (e.g., a "woman's channel" or the operation of a channel by a private entrepreneur in a manner similar to an independent radio or broadcast TV station).

Of these, foremost is pay cable. The obvious financial incentive in being able to offer, for example, the world's heavyweight boxing championship match to cable subscribers for an extra fee, has been described many times. Even if the current six million cabled homes were used as a base (rather than a future 20 million or 30 million), if half agreed to view the fight for a $10 fee, the gross of $30 million would be enough to compete against the present closed circuit and broadcast interests.

Such attractions are relatively rare, however, and the current group of companies in the pay cable field appear to be emphasizing first run movies and the more routine sports events.

The path to riches is still somewhat cluttered, however. Each pay cable group has its own technical approach as to how access is granted to the subscriber to view the premium feature, as well as the way in which records are kept and the subscribers are billed. In many cases, two-way cable communications are required, with a computer at the headend keeping track of access and billing.

A number of technical problems exist. The home terminals provided to subscribers to select the features they wish to see must be both reliable and low in cost, which is difficult to achieve. If a terminal costs $100, for example, and must be furnished to 10,000 scbscribers, this is a capital investment of $1 million. If the terminal requires many service calls the investment goes up rapidly, and it takes a much longer period of time for the pay cable promoter to begin making a profit.

Other problems are economic in nature. Cable system operators wish to get additional revenue from the leased access channels which are not in use. On the other hand, they are not too eager to consummate a lease if the lessee ends up with most of the profits. Many multiple system operators (MSO's), for this reason, are considering operating their own pay cable channels.

The sources of premium programming, such as the movie and television companies, view pay cable with some apprehension. They are in effect reducing the movie and network television grosses if they sell their features to cable. Thus, there is a continual balancing of prospective profits and losses.

These factors have tended to slow the arrival of pay cable. There is sufficient activity in this area, however, to provide an excellent market test of the economic viability of pay cable[1] in the next two to three years. Some entries in the field are:

- Theatre VisioN, owned jointly by Chromalloy American and Laser Link Corp., has started market test operations on a cable system in Sarasota, Florida. It provides a choice of movies on three channels, for a cost averaging $2.00 each. Magnetically coded tickets are provided in advance and are used by inserting them into a home terminal that unscrambles the video picture and also records the transaction.
- Optical Systems Corp., in March 1973, inaugurated pay cable on the country's largest cable system, the Cox American system in San Diego (almost 70,000 subscribers). Optical Sys-

[1]It is still too early to tell whether pay cable will develop on leased channels. Some pay cable systems are now using leased channels, an arrangement by which the pay cable entrepreneur compensates the cable operator for use of the channel. Other pay cable systems are run entirely by the cable system. Still other pay cable systems are a hybrid of the two, whereby the cable operator and an outside agency divide the responsibility for program procurement, hardware supply, and subscriber sales, and also divide the revenue derived from the pay cable operation.

tems' technique uses a card with holes punched in it rather than magnetic coding. Tickets are priced according to the attraction.

• Home Theater Network has negotiated channel lease agreements with MSO's having a total of over 500,000 subscribers. First tests are scheduled on a system in Redondo Beach, California, in 1973-74. HTN's approach requires the subscriber to dial a toll free long distance phone number connected to a computer. A special tone is sent from a unit in the subscriber's home. The computer recognizes the tone, identifies the subscriber, and sends an instruction to the local participating cable system to connect the premium channel signal to that subscriber's home.

• TelePrompTer and Magnavox have announced a joint venture to provide pay cable equipment and programs. This approach uses a control box outside the subscriber's home which can be read manually, like a utility meter, or, if the system has two-way capability, can be read automatically from the headend.

• A Sterling Communications cable system in Long Island offers subscribers a choice of two services. Basic service, essentially that required by the FCC, is available at a $3.00 per month charge. For an additional $3.00, subscribers can receive special service which includes more over-the-air programs, plus sports events from New York's Madison Square Garden and feature movies without commercials.

It may be noted that none of these systems are compatible technically. Whichever "black box" is installed initially in a subscriber's home may strongly determine the future premium programs he will receive, since it will not be feasible to put a number of different boxes in each home. Consequently, the terminal unit tends to establish a semi-monopoly. The introduction of pay cable will be accompanied by intense efforts by each protagonist to gain a major share of the market, and the resultant conflict will be reminiscent of the color television, long-playing record, and video cassette battles.

Apart from pay cable, a few advertiser supported applications that can utilize leased channels have been explored, though in a preliminary way.

Some specific examples are:

• On San Francisco Cablevision, a program termed "Vacancy Factor" has been cablecast. Available apartments are shown via videotapes made at the apartment locations. In this case, the advertiser is the real estate agent. Viewers can see the exterior neighborhood and the interior of the apartment without leaving their homes. Real estate agents in other communities have tested the same concept using slides and movies of homes and apartments, and the extension to cable appears a natural one.

• In Pittsfield, Massachusetts, the cable system owned by Warner Cable Corp. used remote cablecasting facilities in conjunction with an appliance dealer's sale of television and stereo equipment. The two-hour cablecast from the dealer's showrooms featuring interviews, display of items, auctions, door prizes, etc., resulted in the direct sale of 52 units ordered by telephone.

• Several large corporations have cablecast job opportunities, describing the opportunities available and showing the company facilities and working conditions.

Other uses are now in the planning and feasibility stages. One recent study for the Office of Telecommunications Policy in the White House, for example, has analyzed the viability of providing adult extension courses over a leased channel. This concept is different from the free education channel in that the courses would be offered on a premium (pay) basis, for credit by a local college or university. The university would prepare the video-taped programs for cablecasting. Private channel techniques would be used, just as for the pay cable entertainment services described above.

The results of the feasibility analysis indicated that for cable systems larger than 5,000 subscribers, the concept was feasible. Including program production costs, channel access equipment, and estimated channel leasing charges, the cost to the subscriber would be no more than current extension course fees (perhaps $1 to $2 per hour), and all parties involved could show a profit.

There is admittedly much uncertainty in analyses like these. Since no standard charges are established for leasing channels, each case is subject to individual negotiation. It is likely that for the next few years, leasing charges may be low since the channels will be available and producing no revenue. Once new uses for cable become firmly established, the probability is that the supply will not be capable of meeting the demand — like parking space in crowded cities — and leasing rates will increase to whatever the traffic will bear. This will have a negative effect on all but the most lucrative services.

On the other hand, the FCC's rules require that whenever all operational channels are in use during 80 per cent of the weekdays (Monday-Friday), for 80 per cent of the time during any consecutive three hour period for six consecutive weeks, the

system will have six months in which to make a new channel available. The rules add, however, that if it were necessary to rebuild or add extensive new plant, this could not be reasonably effected within a six month period. The commission goes on to say that, "Because this part of our program is a relatively uncharted area, we will make it a matter of continuing regulatory concern." In the face of great expense to the cable operator for laying additional cable after a system has been built, it remains to be seen how rigorously this expansion rule will be treated.

Policy Considerations

The FCC has not controlled rates for leased channels. However, it is questionable, under the commission's rules, whether the cities have the right to do so.

In any event, during initial franchise proceedings and later renegotiations, the franchisee can be requested to provide a proposed schedule of leasing charges, and perhaps also be constrained to receive prior approval of the franchising authority before increasing their charges.

In many cases, local government itself may wish to lease additional channels for public service communications (e.g., a link among the city hospitals). At the present time, there are no preferential provisions for such cases, but franchising authorities can contemplate requesting such preference, using the waiver route if necessary.

One troubling question is whether the leased access channels fall into the common carrier classification. Since the cable operator has no programming responsibility but merely provides a communications conduit, there is a strong common carrier resemblance. However, this question is not expected to be resolved for some time.

One other area of potential controversy should be noted. To gain the backing of local community minority groups, many of whom strongly desire not only access but control of a significant share of cable programming, at least one cable operator has agreed to provide leased channels and production facilities to a consortium of such groups at a nominal lease rate of $1.00 per year. This may run counter both to an FCC position that the number of free access channels should not be greater than those designated, and to an implied requirement of standardized leased channel charges. However, variations from such FCC positions may be approved if sufficient justification for the variance is submitted to the FCC in the certification process.

Uses and Services Not Mandated by the Federal Communications Commission: Two-Way Communications

Over and above the services mandated by the FCC, a cable system can, if properly designed, accommodate a broad range of other communications requirements.

Most of these, however, need two-way communications capability. Some, in addition, are more compatible with point-to-point links than with a party line network. Still others impose special operational constraints such as data security and privacy.

It has been noted that the FCC's requirements for two-way communications are minimal, and can be added in the future rather than being installed as an initial part of the cable system. Nevertheless, because of the potential revenue from two-way services, almost all new systems include plans for rapid incorporation of two-way capability. The usual way of doing this is to use amplifiers that accept additional plug-in modules which convert a one-way cable into a two-way configuration. For a single cable system, the frequencies used for upstream communications lie below channel two, the lowest downstream channel. By using the 10 to 35 megahertz range, known as the "sub-band," from 1 to 4 upstream channels can be provided.

If a dual cable system is installed, the second cable can be divided almost equally, permitting up to 15 channels each for upstream and downstream communications. With this capacity, cable systems can meet growing community requirements for some time to come.

SUBSCRIBER SERVICES

At present, there are a small number of prototype two-way cable systems either ready to commence test operations or still in the planning and construction stage. When these have tested both the market for new services and the technology, they will set a pattern for widespread adoption by other cable systems.

All of these prototype systems are focusing on new subscriber services, i.e., services that can be provided by two-way communications between the headend and subscribers. This emphasis is natural since subscribers are the major paying customers thus far and it is considered easier to sell new services to the same customers than to attempt to open up speculative new markets.

Subscriber services may be further subdivided into "subscriber response services" and "subscriber initiated services." In the former, subscribers, through home terminals send responses to headend queries. Opinion polling, utility meter reading, and alarm monitoring fall into this category. In the latter case, a subscriber initiates a request for service or information, as in ticket or hotel reservation services or information retrieval application.

There is less current activity by cable operators in the area of providing institutional communications services. From the viewpoint of many communities, however, such services are extremely important.

Figure 6 lists some prototype two-way cable systems. All of these systems use the same basic approach, consisting of digital communications in polling/response sequence. The characteristics of this approach are:

— Each subscriber has a home terminal that carries an electronic "address." Unless the signal from the headend includes this address, the terminal will remain inactive.

— Communications in both directions are computer controlled.

— Subscribers' terminals are polled sequentially to see if a particular terminal has a message the subscriber wishes to send to the headend. If so, the message is accepted, an appropriate response provided, and the next terminal is polled. The polling sequence is so fast (1,000 terminals per second or more) that each subscriber receives an almost instantaneous response.

— Because of the controlled sequence, in which only one short message is sent at any time, the

Figure 6. Prototype Two-Way Systems

Manufacturer	Cable Operator	System	Digital Data Frequency Band (MHz)		Subscriber Polling Rate (Approx.)	Status
			Downstream	Upstream		
Theta-Com	Theta Cable	Subscriber response system (SRS)	108-112	21-25	5,000/sec.	System under construction in El Segundo, Cal.; 20-25 terminals first phase; 1000 planned by 1974.
Scientific-Atlanta	LVO Cable	Two-way digital security system	111.1-113.9	0.225-0.275 or 5.25-5.75	8,192 per 10 sec.	System for fire and burglar alarm under construction near Chicago (Carpentersville, Ill.). Similar system under test in city-owned cable system in Monroe, Ga. (6 terminals each).
Viacom	Telecable	Broadband two-way cable communications system	108-114	6-10	between 6,000 and 30,000/sec.	Two experimental installations: Overland Park, Kan., (6 terminals now phased out); Detroit (auto plant); new system under construction in Spartanburg, S.C.
TOCOM Mfg.	Total Communications of Irving	TOCOM	50	6-30	1,000/sec. max.	Wiring up one test area of Irving, Tex. Will provide basic service free to all residents and charge only for pay-cable and two-way sys.
Electronic Industrial Engineering	ATC	COMSERV	FM band 88-108	12-14	1,000/sec. max.	System under construction in Orlando, Fla.; 27 terminals; first phase; 500 planned by end of 1973.
General Electric	Community Information Systems	Broadband two-way cable communications system	unknown	unknown	unknown	System planned for "new community" in Jonathan, Minn.; partially funded by Dept. of Housing and Urban Development

bandwidth required is low — a fraction of a video channel in each direction.

In theory, such address/response systems can provide a large number of subscriber services. In the "subscriber response" category are:

Subscriber polling

A program discussing a subject of political or community interest, for example, can be accompanied by a request to viewers to vote "Yes," "No" or "Undecided" by pushing one of three buttons on the home terminal. Each terminal is then polled and the results tabulated immediately.

It is also possible to poll viewing habits without even asking for an expression by the subscribers, by designing the home terminal so that it automatically records the channel tuned-to at that time. While this carries "Big Brother" overtones, it is not different in principle from an occasionally used technique in which trucks with sensitive electronic equipment drive through the streets of a city picking up radiation that indicates which over-the-air channel viewers' television sets are tuned to.

Potential violations of privacy on two-way cable systems are a matter of serious concern to many individuals. There is a growing sentiment that this aspect of cable be severely regulated or even prohibited. The basic point made is that unless cable subscribers give explicit permission to have their habits monitored and tabulated, the cable operator has no right to do so or to make the facilities available for others to do so. The argument that this practice exists in other areas is countered by the contention that existing abuse is not a justification for further abuse.

An offshoot of such polling or monitoring is the possibility of the results being used for commercial gain. Advertisers, for example, would probably pay for selected lists that segregate subscribers who regularly watch their sponsored programs. Again, there are protests against this possibility, just as there have been against the sale of drivers license data by a number of state motor vehicle departments, for example.

Automated shopping

A department store or mail order house may use a leased channel to demonstrate products for sale, each with a code number.[1] Any subscriber wishing to buy an item would respond by entering that code number in his home terminal.

Obviously, this service must include some protection against errors and false requests to minimize potential complaints if a subscriber receives the wrong item or an item he claims was never ordered. One suggested approach is to include a printer in the home terminal so the subscriber gets a printed copy of the transaction at the time the order is placed.

Sensor monitoring

The polling/response technique need not depend upon a subscriber making manual entry into the home terminal. A variety of sensors can be connected to the terminal and their outputs scanned automatically. If the sensors were thermostatic switches located in various parts of the home they would form a fire alarm system. If intrusion sensors were used the results could be a burglar alarm system. If the sensors were connected from the electric or water meters an automatic utility meter reading system would be formed.

Many of these services are much more complex in practice than in theory. The incidence of false alarms has already rendered many fire alarm systems which use telephone lines virtually useless, and this poses a problem to cable systems as well. Transient signals and interference that may be tolerable for television programs can completely incapacitate alarm systems.

Another problem is that many of these services are useful only if 100 per cent of the public is connected to the cable. This raises the question of subsidizing connections to non-subscribers. If this is not done, an alarm system or even a meter reading system that covers perhaps only 30 per cent of the population may not be of great value.

In the "subscriber initiated" category, some examples of services considered technically feasible include:

Transaction processing

A number of business transactions initiated by the subscriber can be made compatible with the polling/response technique. These include requesting hotel, automobile and airline reservations, credit checks, stock market purchases and sales, bank deposits and withdrawals, etc. Some of these services are probably not likely to occur soon for a variety of reasons. In some cases, telephone circuits will be as satisfactory as cable. In others, the safeguards required to make the system foolproof will be too expensive.

Information retrieval

Retrieval of information, whether from computer data banks or micro-film systems, and the delivery

[1]This assumes that if this service could be provided cheaply enough, it would be in demand. The assumption may be incorrect. In a public opinion survey in the Dayton, Ohio, area, 57 per cent of the respondents disagreed with the following statement:

> It would be desirable if new and imaginative uses were created for television, such as shopping via television, voting in elections via television, etc.

of such information upon request to home subscribers, has often been described as promising to revolutionize the reading, study, and leisure habits of the nation. Some feasibility demonstrations of "frame retrieval" (the presentation of a page of information on the television screen at a time) have been made, notably Mitre Corporation's TICCIT system.

Information retrieval systems for cable, however, require a much more elaborate and expensive home terminal than the services mentioned above. In addition, a huge, centralized, computer controlled library of software would have to be developed at great cost and effort. For these reasons, the application appears certain to be many years in coming, if at all.

Electronic newspapers and magazines

If each home terminal contained a facsimile receiver, it would be possible to provide in-home delivery of newspapers and magazines by sending the text and pictures in electronic form through the cable. This application, in which the same message is sent, is much less complex than "electronic mail" in which different information is sent to each subscriber.

Again, however, the home terminal must be much more expensive, in addition to the problem of providing a supply of paper. It is difficult to foresee a time when the cost would be competitive with, for example, the 10 cents per day cost and home delivery of newspapers.

Pay cable (expanded versions)

The addition of a two-way polling/response capability makes it practical to expand the ability to provide pay cable services. The features of a separate pay cable decoder can be incorporated within the home terminal, thus eliminating this extra cost. The presence of a computer in the headend permits control of a number of premium channels simultaneously, again at small incremental cost. Thus, it is possible, for example, for one person in a home, watching one television set, to request the premium movie, while another person watching a second set in another room can be viewing another pay cable offering, such as golf lessons.

It is obvious that in all these subscriber services, perhaps the most critical component is the home terminal. Since thousands are required for a large cable system the cost must be low, yet the performance and reliability quite high for a household device.

Figure 7 illustrates the approximate cost ranges and service capabilities of progressively more sophisticated subscriber terminals, constructed with present state of the art capability. For the very low quantities actually constructed thus far for the systems listed in Figure 6, terminal costs have been in the range of $500 to $2,000 each. Manufacturer's estimates are that in 1,000 lot quantities the cost can be reduced to perhaps the $50 to $200 range, but this remains to be demonstrated.

Figure 7. Cost Ranges of Subscriber Terminals

Terminal Capability	Approx. Cost Range	Services Capability
A. *Subscriber Response:*		*Note:* Each more costly terminal incorporates the capability of simpler units
Yes – No (1 switch)	$10 to $30	Subscriber polling
Choice: 1 out of 10 (10 switches or 1 ten-position selector)	$30 to $60	Automated shopping Sensor monitoring (cost of sensors extra) Pay cable selection
B. *Subscriber Initiated:*		
Request transaction (keyboard/cathode-ray tube)	$100 to $500	Credit check Reservations Bank clearances
Request retrieval of information (keyboard/minicomputer)	$200 to $1,000	Frame retrieval
Information printout (facsimile printers)	$500 to $2,000	Electronic newspapers

Since the cost per subscriber to construct and install a cable TV system is perhaps $100 to $200 for new, major market systems (one-way), it is evident that the home terminal alone can double or triple the total system cost at the figures estimated above. This is a strong deterrent to providing new two-way services, at least until it can be shown that subscribers are willing to pay enough for them to cover the added costs. Hopefully, the prototype systems will provide data on this question.

Policy Considerations

Policy issues that confront franchising authorities with respect to two-way subscriber services are difficult to define precisely since most of the services are experimental and speculative at this time. It would be foolish, for example, to compel a system operator to include a full two-way subscriber response system into the cable network, at great expense, unless there were some reasonable certainty that the added equipment and services would be used and paid for.

On the other hand, some advance requirements are reasonable. Two-way systems are much more susceptible to interference and signal degradation than one-way systems, and must be designed and constructed with special consideration to such factors as proper grounding and shielding, interference free connectors and components, etc. If these are not part of the initial cable system, the future capacity to provide new services may be compromised seriously. Consequently, foresight on the part of franchising authorities in establishing minimum technical standards (not required by the FCC for two-way services) may be prudent.

OTHER TWO-WAY COMMUNICATIONS

Institutional Services

Even though the two-way, digital subscriber services described above are still to be tested in the market place, they are technically very compatible with the party line, one-point-to-many-points, configuration of the conventional cable television system. The fact that signals are in digital rather than video form affects only the terminal devices at the sending and receiving locations.

There is a completely different category of communications services, however, in which contact with cable systems' subscribers is not important, or may not even be desired. This category may be termed "institutional communications," in which "institutional" can mean any user other than home subscribers. Included might be businesses, schools, hospitals, public agencies, and even individuals with special communications needs.

Alternative means of satisfying these needs (e.g., telephone, telegraph, private radio, etc.) generally exist. In many cases, however, the broadband, multi-channel capability of cable offers a better solution, and in some cases, perhaps the only viable solution.

Institutional services are much less compatible with conventional cable television system design than subscriber services, for several reasons:

1. There may be a substantial requirement for "point-to-point" communication. Examples are a school communicating with other schools, bank branches with each other, a hospital with an outpatient clinic, etc. Such communications are difficult to achieve with the party line configuration which has only one major origination point.
2. There may be as much information flow in one direction as the other, and the information may be in any form — data, voice or video. Any user at any point with the proper terminal equipment may wish to send any or all of these forms, and also to have the flexibility to change his communications format in the future.

The revenue structure may be completely different. Some users may expect to pay on an as-used basis, again like telephone service. Others may lease channels or portions of channels for permanent use at fixed rates. Thus a cable network for these services may, again, strongly resemble a common carrier

Practically no cable television systems have yet been designed with institutional services as a prime motivating factor. Much of the required technology has been tested, though, in other applications. For example, a number of hospital, educational, and business communications links exist that utilize extensive two-way communications via either closed circuit cable or microwave networks.

Thus, there is a good deal of data already available on terminals, operating techniques, costs, problems encountered, etc. Much of this is applicable to a cable system which simply may offer a better method of distributing many communications services than other options currently available.

A key problem which must be realized and faced by all communities that desire to use a cable system for non-entertainment services, is that a cable system designed primarily for subscriber services probably will not be an optimum configuration

for institutional services. In some cases, if care is not exercised in the preliminary planning of the system, it may not be possible to provide both kinds of service. In other cases, two separate cable systems may be preferable to a poor hybrid. In such a situation, the institutional services cable probably would not be classified as a cable television system at all, but a community communications network. There would be some cost saving in both systems sharing duct or pole facilities, but it is by no means clear that it would be necessary to have the same ownership and operating entity for both.

Interactive Educational Services

With two-way cable systems, educational applications can be expanded to include interactive instruction in which the student plays an active participatory role. This can occur either in interactive television-based courses, or in the newer field of computer assisted instruction (CAI).

Interactive television-based instruction consists of instructional material furnished to students as a television display, but with the opportunity for each student to ask questions, comment, or discuss the material during or immediately after the presentation. Thus, it more closely simulates a true classroom environment.

A good example of this approach is the system in operation since 1969 at Stanford University. This system uses an ITFS[1] microwave system for signal distribution, but exactly the same approach is possible for cable systems.

The objective of the Stanford system is to provide off-campus instruction to graduate students working at some 40 to 50 companies in the San Francisco bay area. Courses are sent to receiving equipment and classrooms at each company, thus saving commuting time and costs and allowing a greater course enrollment than otherwise would be possible.

Up to four separate courses are broadcast simultaneously from on-campus "studio-classrooms." These resemble conventional classrooms, equipped with two video cameras, one over the instructor's desk and the other at the rear of the room. Both cameras have remote controlled tilt-pan-zoom capability.

Monitor picture tubes and microphones are located throughout the classroom, one for each two students. By depressing a microphone switch, a student's voice can be heard throughout the system.

The off-campus classrooms at each company are equipped with television receivers and talk-back microphones. Students there can participate in the discussion just as if they were in the on-campus classroom.

This technique permits full participation by students both on-campus and off. Some standardized procedures are necessary to minimize simultaneous comments from many students, but this has not proven to be a problem.

A system similar to this could be provided via cable. For example, a program originating from one school in the franchise area might be cabled to other schools, each equipped with talk-back facilities in one or more classrooms. Many classes could, in this way, take the same course simultaneously, with full student participation. The best instructors could be assigned to give such courses, making their talent more widely available. At the same time, overall costs of instruction could well be reduced.

The second major category of interactive educational services is that of computer based instruction. Machine assisted teaching is some 40 to 50 years old but only in the last decade has the power of the digital computer been applied to education on a systematic basis.

CAI is still evolving, both in techniques and in educational objectives, and there is much debate both as to its cost effectiveness and also the results achieved. Without attempting a judgment in these two areas, CAI nevertheless is especially compatible with cable communications. CAI implies a centralized computer, with communications links to a number of remote locations; and a cable system can provide both the geographical coverage and adequate channel capacity needed.

In its present form, CAI includes a computer and a library of instructional programs. Students, at any location, are equipped with an input-output terminal (usually a standard teleprinter because of its relatively low cost) that can communicate with the computer. Through this terminal, the student can receive instructional assistance in a variety of ways. The simplest is "drill-and practice." Here the computer presents exercises, in increasing order of difficulty, to the student, testing the answers at each step. More complex forms of CAI may involve simulation in which the computer is used to set up a model of a situation (e.g., a business enterprise), and the student works with this model. Another CAI technique is for the student to use the computer as a tool in problem solving

[1] ITFS (Instructional Television Fixed Services) is a microwave frequency allocation set aside by the FCC for educational uses. It is an over-the-air service, but can be received only with special equipment.

rather than a textbook, with each student working at an individual pace.

An example of CAI in operation is the University of Illinois' PLATO (Programmed Logic for Automatic Teaching Operations), which has been evolving since 1961. In 1962-63, the system consisted of two terminals time-sharing a Control Data Corp. "1604" computer. This was expanded in 1964 to the PLATO III configuration, featuring a computer classroom of 20 graphic/pictorial terminals.

Some of the subjects for which CAI courses were developed for PLATO include electrical engineering, geometry, biology, nursing, library science, pharmacology, chemistry, algebra, computer programming, and foreign languages. More than 100,000 student-terminal-hours, much of this for academic credit, have been logged on the PLATO III system.

PLATO III costs have ranged from $2 to $3 per student-terminal-hour, which is about in the middle of experienced CAI costs in general (estimated at $1.50 to $5.00). This contrasts with about $.25 to $.50 per student hour for conventional instructional costs in elementary schools.

Because of this higher cost, PLATO IV has been developed to more nearly approximate conventional costs. The principal features of PLATO IV are:

— The design of a novel student terminal, utilizing a plasma display panel

— The use of a large scale computer to achieve economies of scale, designed to serve up to 4,000 student stations and teach several hundred lessons simultaneously

— Communications capability to within a 150-mile radius of the computer center. (This is more than adequate for most cable systems if the computer is located in or near the franchise area.)

The key item is the plasma terminal designed to combine high performance and low cost. Its concept can be likened to a display sign made of thousands of incandescent light bulbs. The plasma panel is transparent, allowing other optically projected images to be projected on the matrix image. Thus any combination of photographic and graphical material can be displayed. This permits combining a microfilm and computer-based system, providing a wide range of visual, graphic, and alphanumeric capability.

Figure 8 shows the projected costs of PLATO IV, achieving an objective of $.34 per student-terminal-hour, which compares favorably with conventional instruction.

PLATO IV obviously is a large-scale system, requiring a sizeable student base to achieve its economies. For smaller systems, the costs may well be difficult to justify.

As might be expected, the software library necessary for effective CAI represents a major expenditure of time and manpower, in many cases greater than the equipment cost. Preparation of a single course in acceptable CAI form can easily cost $25,000 to $100,000 or more.

Nevertheless, many schools and educators who

Figure 8. Projected Costs – PLATO IV

Item	Total Cost (Million $)	Cost/Year (5 Year Period) (Million $)	Cost Per Student Terminal Hour* (Cents)
Computer system	4.5	0.9	9
Software	1.5	0.3	9
Student terminals ($1,800 each)	7.5	1.5	15
	13.5	2.7	27
Lesson material			3
Communications			4
		Total	34¢

*Usage assumed at 10 million student-terminal-hours per year.

have worked with CAI claim that these costs can be justified on the basis of improved learning and also reduced instructional costs once the software has become operational.

The main advantage a cable system offers to CAI is a lower cost for the communications link. For the PLATO IV system, where Figure 8 indicates communications costs at only four cents per student-terminal-hour, this may not seem significant. Most other CAI applications to date, however, use telephone circuits, with high monthly costs. If a cable is connected between two schools, for example, a voice-frequency link can be made available at a fraction of the cost of a commercial phone line circuit.

Such inter-school links, capable of data communications, might also be used for educational record keeping, accounting, and management functions. In theory, pupil records, for example, could be stored at one location for an entire school district and updated through terminals and communications links. This, of course, would require procedural changes that many communities may be reluctant to implement, but the possibility for effecting economies remains.

Municipal Services—Health Care

In the field of municipal or public communications services, it has been noted that there now exist a number of alternatives for transmitting one-way information, other than via cable. In this area, perhaps more than any other, the advent of two-way communications will open up many new possibilities.

Two areas of high priority are health care and public safety services. These can be used to illustrate cable's potential for improving municipal communications.

The staggering increase in the cost of health care needs no reiteration. Although many other factors are involved, poor communications and exchange of information certainly contributes to the increase.

This has led to consideration of how telecommunications might improve the delivery of health care services. Many experimental and pilot applications have been developed in the last 15 years, using various combinations of closed-circuit cable, microwave, and telephone links. More recently, cable systems have been included in such applications. Three examples are:

- Under Department of Health, Education and Welfare sponsorship, TelePrompTer installed a two-way video link between Mt. Sinai Hospital in New York City and a pediatric clinic at the Robert Wagner Housing Project, located about 1.5 miles away. With this link, physicians at the hospital can assist in diagnosis and treatment of patients at the clinic without leaving the hospital, leaving implementation to clinic nurses and paramedics. This helps increase the effectiveness of scarce physician personnel, and also reduces overcrowding at the hospital.
- A cable system in Denver, Colorado, will provide two-way communications among the University of Colorado Medical School, Denver General Hospital, two large clinics, and six neighborhood health centers. Real time teleconsultation and telediagnosis will be provided, as well as the ability to transmit physiological data (x-ray, EKG, etc.) and patient health records.
- A cable system planned for the Watts area of Los Angeles will have two-way links between the new Martin Luther King, Jr. Hospital and physicians' offices. Programs of continuing progressional education and also teleconsultation are scheduled.

In contrast to educational communications, many health care services require no substantial programming costs. Telediagnosis, for example, is a service in which physicians act, remotely, in the same way they would if face-to-face with patients. Information interchange of medical records, as another example, again requires no programming.

Consequently, the major costs are for terminal equipment for services with little or no programming required. Figure 9 shows the range of costs involved for various types of terminals that might be used in medical communications.

Facsimile terminals can be used to transmit and receive visual analog data such as electrocardiograph charts, and can also be used for document reproduction. Slow-scan TV is used for static visual images where better resolution is necessary than facsimile can provide, such as x-ray or microfilm records. High resolution TV provides extra-fine reproduction of moving visual images, such as the details of a surgical operation. Teleprinters are utilized for transmission and printout of alphanumeric information, either under manual or computer control. Keyboard/cathode ray tube terminals are used to query a computer and receive back a graphical reply, or alphanumeric information where no permanent copy is required.

These terminal costs would normally be borne by the user organizations, rather than the cable operator who would furnish (presumably under lease) the necessary two-way channels. Each local

Figure 9. Terminal Equipment Costs – Health Care Communications

Item	Cost (Approx.)	
TERMINAL EQUIPMENT:		
Facsimile terminals	Low speed (4-6 min. per page)	$ 5,000 per set
	Medium speed (1-3 min. per page)	15,000 per set
	High speed (15 sec.-1 min. per page)	25,000 per set
Slow scan TV	Scanner/transmitter	$25,000
	Receiver/display	4,000
High resolution TV	Scanner/transmitter	$40,000
	Receiver/display	10,000
Teleprinters	$1,500 to $4,000	
Keyboard/cathode ray tube	$3,000 to $8,000	

Facility	Terminal Equipment	Quantity	Cost
Typical hospital	(a) *High resolution TV*:		
	Scanner/transmitter	2	$ 80,000
	Receiver/display	6	24,000
	(b) *Slow-scan TV*:		
	Scanner/transmitter	2	50,000
	Receiver/display	6	8,000
	(c) *Facsimile*:		
	Transceiver sets (medium speed)	6	90,000
	(d) Teleprinters (@ $3,000)	6	18,000
			$270,000
Typical nursing home, health center, etc.	(a) High resolution TV	None	
	(b) *Slow-scan TV*:		
	Receiver/display	1	$ 25,000
	(c) *Facsimile*:		
	Transceiver sets	1	15,000
	(d) Teleprinters	1	3,000
			$ 43,000

government or individual agency, therefore, would have to determine whether such expenditures were justified. In many cases, however, it should be noted that costs already are being expended to attain the desired objectives, using media other than cable, and that these monies may be transferable.

Operating costs are difficult to isolate, since in many cases hospital technicians with other duties will be trained to operate the terminal. It may be possible, in fact, to reduce total operating expenses if information interchange via cable achieves the objective of being a more efficient technique than other alternatives.

Municipal Service—Public Safety

One of the most promising fields in which cable may benefit communities is that of public safety. Development to the present has been somewhat less than that for education or health, but the long-term potential may be just as great. Most services contemplated in the public safety area fall into the closed circuit category.

Some of the cable services under consideration include:

Area and traffic surveillance

A number of cities are already using television cameras and closed circuit cable system to visually

monitor an area, either for traffic control or crime deterrence. The cameras are connected to a surveillance center, where the information is displayed and evaluated for possible action.

Several cameras and/or areas can time share the same cable channel to minimize the required bandwidth. Each area would then be scanned periodically rather than continuously.

Detection and alarm monitoring

The possibility of using cable as a fire alarm or burglar alarm communications network has been mentioned many times. In concept, for a fire alarm system, thermostatic switches, like those now used to trigger sprinkler systems, would be connected through home terminals to a central monitoring station. For a burglar alarm system, a variety of anti-intrusion devices could serve as the sensors, again cabled to a central location.

Reducing this concept to practicality involves both technical and economic problems. The sensors must be low in cost, yet reliable. The cable system itself must not introduce false alarms. Both of these conditions are not yet achievable at reasonable cost.

In addition, alarm systems would be of doubtful value if 100 per cent of all homes and buildings were not connected. The question of what to do about those homes which do not subscribe to cable remains to be solved.

A relatively new concept, but one that is very compatible with cable, is that of automatic pollution monitoring. A number of sensors would be located throughout an area, measuring, for example, the level of carbon monoxide in the air. These would have their output signals connected into the cable system, with hundreds or even thousands of sensors sharing a cable channel.

The signals coming into a central collection point would provide a precise pattern of the level of air pollution in the area, on a round-the-clock basis.

One strong advantage of this type of system is that, unlike a fire alarm system, a malfunction of one or a few sensors is not critical. The statistical information acquired depends upon the bulk of sensors working properly and a few defective ones will not significantly degrade the results. This is an ideal situation where many sensors are involved, and makes the concept eminently practical.

Information interchange

Probably the single most useful category is that of information interchange, considering the vast number of legal and administrative records and information that must be communicated among public agencies.

Typical examples of information interchange include:

— Criminal identification (visual and fingerprint)
— Remote "line-up" proceedings
— Remote court testimony (e.g., by police officers in minor traffic cases, testifying from station houses)
— Transfer of probation, prison and court records.

All of these applications could be provided over two-way cable with standard terminal equipment such as teleprinters, facsimile, and video cameras and tape recorders. Private channel operation and data security would be important considerations, however. Many applications might be feasible on one-way cable with an independent voice return link, either through a separate dedicated cable or the telephone network.

Manpower training and instruction

The case of firemen using videotapes of fire fighting for instruction has been mentioned. With two-way communications linking police precincts and fire stations, the capability to improve training would be further enhanced. Live, film, or taped material could be distributed on either a one-way basis or with the capability for teleconferencing.

For example, a fire fighting film might be presented in conjunction with questions and answers between a centrally located instructor and each fire station. This would be similar to the two-way Stanford system.

Business Services

Although two-way business services are considered a good source of future cable revenue, it is likely that such services will be among the last to be implemented.

One problem is that a cable system covers only a limited geographical area. If, for example, a data communications link is desired among all bank branches in a state, many communities where bank branches exist may not be covered by cable. An incomplete network would be of very limited use and in such a case it is likely that the telephone system would be used.

Another problem is that the reliability of a cable system will be a strong factor since business communications are generally considered urgent. Many businesses will prefer to wait until a proven record of reliable service has been established.

Nevertheless, many services compatible with cable are developing rapidly. As one example, the U.S. Postal Service now provides facsimile mail service between selected cities. Designed for the transmission of important business documents at a cost of $3.00 to $4.00 per page, documents can

be received within a few minutes of transmission, at the receiving postal station.

A similar service is now available commercially. Facsimile transceivers are installed in each Hilton hotel across the country, and, for a fee, documents can be transmitted to the hotel in the destination city, for immediate pickup.

Such services can be provided via cable, if the cable system includes the points of origin and destination. In fact, facsimile transmission can be even faster by cable, since usually a bandwidth wider than a usual voice-grade phone line can be allotted. This wider bandwidth permits a proportionate increase in transmission speed so that a page can be sent in less than one minute, as compared to three to six minutes over phone lines.

Computer time sharing, in which businesses can share the computation and data processing ability of a remote computer, is also a growing service that can interface with a cable system. Again, the major determining factor would be whether the cable system served a sufficient area and a broad enough customer base to be economically feasible. Large city systems, in many cases, would be viable.

Security and alarm systems are of special interest to businesses in many cities. The same reliability problems mentioned in connection with public safety communications apply here, too, except that 100 per cent connection is no longer an issue since each business alarm system may be independent.

One prospect that appears attractive for newly developed communities or sub-communities is the centralized communications facility, served by cable. A new shopping center or industrial park, for example, can be planned to include a central facility that provides security/alarm, video, facsimile, teleprinter, computer time sharing, and data processing services to all users on an as-required basis. Thus, services that may be too expensive for an individual business may be practical if shared among many.

Policy Considerations

Even from the cursory review of potential two-way communications services above, it can be concluded that if such services can truly be provided at reasonable cost, they offer the opportunity for a quantum improvement in urban and suburban communications and, to some extent, in the quality of life itself in many communities.

Many services are technically feasible with present technology, and may in a very short term be economically feasible. With some services, public communications may be impacted heavily.

Consequently, such future services must be considered very carefully during the franchising process. Admittedly, problems remain to be solved before two-way cable is a reality; but the services promised are of such importance that their evolution cannot merely be left to chance.

In many localities, particularly those where undergrounding of cable is required, the installation cost of a cable system is so staggering that almost any alternative is preferable to having, in effect, to dig up the community twice. Here the provision of extra cable (even three and four spare cables in some instances) may be a wise expenditure. If, however, such spares are intended for public services in the future, it appears equitable that local government be prepared to underwrite the incremental costs rather than expect them as a gift from the franchisee.

A prerequisite to this kind of determination would be a survey of local governmental agencies (health, public safety, etc.) to ascertain, even on a preliminary basis, what uses they might make of the cable. In some cases, this will be an interactive process with potential users having to learn about the capability and costs of cable first, and then relating these to their operational requirements. In other cases, many local agencies will have firm requirements already in hand.

Possibly the most difficult problem to solve will be how to avoid inadvertent foreclosure of future two-way services. Obviously they cannot be specified in great detail at this time, so that posing detailed specification requirements is not possible. Ignoring the subject, on the other hand, may very well result in a cable system designed such that many services will be too expensive to add later.

As an example, privacy and security features are almost certain to be required for public safety communications. If these features are not considered when the cable system is originally designed, they may be very difficult to provide later, without inordinate cost and effort.

No amount of planning will eliminate all problems, when the future cannot be foreseen precisely. The task of each franchising authority will be to strike a reasonable balance as to what can be planned for, with a degree of confidence that the planning effort will be productive.

CONCLUSIONS AND GUIDELINES

Franchising a new cable system will provide many local governments with their only practicable hope for effecting a major improvement in urban communications in perhaps the next fifteen

or twenty years. For that reason, although the problems certainly are formidable, the effort to evaluate and solve them appears worth the cost and time involved.

The problems are jurisdictional, economic, and technical. In the jurisdictional area, a cable system that places strong emphasis on two-way institutional communications may not be simply a cable television system by the FCC's current definition. In this case, the commission's franchise procedures might be only partially applicable, or not applicable at all.

Secondly, if the system is a hybrid combination of entertainment and nonentertainment services, private and public, what is local government's role in administration and control of the public service sector? How does this interface with the operator?

Who pays the cost of building a cable system for new services, many of them public, and most of them requiring a financial subsidy before being able to show a profit?

How much risk should the initial cable system design include, in terms of ability to be expanded later? The lowest initial cost may well involve the greatest technical risk, meaning a high cost in the future to add new services.

There are no simple answers to these questions and their implications. Some guidelines, however, may make the decision process more logical and perhaps more inclusive of areas that warrant consideration.

Prefranchise

The basic question each franchising authority must decide prior to structuring a cable franchise is "What would local government like the cable system to do?" The answer must, of course, be tempered by a knowledge of the economic and technical implications that accompany each desired use of the cable.

If a franchising authority, after due deliberation, believes that a cable system which supplies only the FCC mandated services is sufficient for its needs (and there are many localities that fall into this category), the prefranchise study and planning requirements are simplified. Even in this case, however, the franchising authority should establish its policy with respect to:

Retransmission

The franchising authority can determine whether distant signals will provide sufficient benefits to justify the added costs, and if so, the signals which are preferred.

Local origination

The franchising authority can determine what emphasis it will place on local community oriented programming, and incorporate this as a specific basis for awarding a franchise. Whether to formalize community participation through an advisory board, or even an equity position, as in the case of Boulder, is a consideration. The desirability of subdistricting can also be established as an award criterion. Origination facilities may either be specified or the applicants may be permitted to describe what they propose, but this factor also can be an award criterion.

Preferably, the criteria should be established on a weighted, quantitative basis, announced in advance so that applicants are fully and equally aware of local government's position.

Public access

The two key questions are channel management and funding for public access programming. Whatever course is taken by a franchising authority, there will be opposition from some quarter, whether it be franchisee, the FCC, or the community groups interested in furthering public access. Funding, in particular, will be a recurring problem unless a mechanism is set up that can generate at least minimal funds on a long-term basis.

Educational channel

The various educational agencies within the franchise area including elementary, secondary, and private schools, and colleges and universities, should participate fully in arriving at recommendations for use of the designated channel. Generally, agreement can be reached among the potential users, if the franchising authority takes the lead in bringing the parties together. If not, the authority may wish to establish a management structure for administering the educational channel.

A study should be made to indicate the need for both open and closed circuit operations, and the franchise requirements established accordingly.

Local government

At least a preliminary survey should be taken among the various local government and public agencies to ascertain their interest in using the available channel, either on an open or restricted basis, and what specific applications may be involved. It is likely that such plans will be tentative, but they can guide the initial organizational and budgeting decisions for the government channel. If a single group is to manage the channel, its administrative structure and authority

should be established early.

Leased channels

The franchising authority can, if it wishes, establish procedures for negotiating channel lease agreements and possibly also consider a rate structure. If it appears that local governmental agencies may themselves lease channels in the forseeable future, a preferential rate schedule may be negotiated.

For those communities that determine that non-mandated services are of sufficient importance to be evaluated prior to awarding a franchise, there is a great deal more work involved. A broader range of potential cable users should be surveyed and the results combined into the specified functional requirements for the cable system.

As an example, the City of Portland, Oregon, and the surrounding county area, are now taking this approach. A cable television advisory task force has been established, consisting of nine sub-groups exploring different uses and services (e.g., health care, education, etc.). Each sub-group has conducted seminars and workshops, inviting institutional and community leaders in the specific fields of interest to participate.

The results of these efforts will be a series of reports defining objectives and desired uses in each area. In effect, this will answer the basic question of what the community desires from the cable system.

This is not enough, however, since it must be related to technical and economic realities. To do this, Portland plans a detailed feasibility study to determine how many of the objectives can reasonably be achieved within the current and projected state of the art, and how many are economically viable.

The study will then be used to establish specific franchise requirements which applicants will respond to. Hopefully, the cable system resulting from the franchise negotiations will represent the closest achievable system responsive to specific community needs and objectives.

Franchise

The franchise agreement generally consists of legal terms and conditions, which will not vary significantly from area to area, and performance requirements, which may vary considerably. The performance requirements are the result of the prefranchise studies and attempt to translate the community's objectives into contractual form.

Two different approaches are possible. In the first, the performance requirements are specified by means of detailed technical design and construction parameters. For example, the cable system configuration (e.g., single or dual-cable, converters, private channels, etc.) may be described in sufficient detail to permit little latitude on the part of the cable operator.

In the second approach, functional requirements are specified, with the means of implementation left up to the franchisee. The franchise might require one open one-way channel, one private one-way channel and four two-way channels, for example, for specified local governmental communications use. It can also describe how those channels are intended to be used, but not restrict the operator in his choice of components or in the design.

Both approaches have advantages and limitations. The first requires more prefranchise analysis by the franchising authority, in many cases entailing expert professional assistance in assuring that the specifications are accurate, reasonable, and will not unduly restrict the franchisee. The advantage is that it permits a more standardized comparison of franchise applications (rather than an "apples versus oranges" comparison as is often the case), and it may be easier to enforce after the franchise is awarded.

The second approach permits franchise applicants to use their creativity and skill, and to take advantage of changes in the technology to provide the best system to the community. Presumably, the applicants are more knowledgeable in selecting the appropriate design to meet given objectives than the franchising authority may be.

Although easier and less costly to local government, this approach has a greater potential for misunderstanding and disagreement. When, at some future time, the government expects compliance with a particular functional objective, it may find that the franchisee's interpretation of what may be adequate differs from its own. Arbitration and/or litigation are not very effective, because differences are usually in semantics and intent, which are difficult to arbitrate.

Apart from the approach to specifying performance, other policy issues should be considered. It has been noted, for example, that many public services depend upon the cable being connected to 100 per cent of the homes and institutions in the area. This requires a subsidy for those who will not or cannot become subscribers. Franchising authorities must balance such a subsidy to achieve true "wired city" status against the public benefits that may accrue. Thus far, no local government has yet made the decision in favor of such a subsidy, but this condition may not prevail in the future.

Allied with the 100 per cent connection issue is the question of funding of public services on the cable. If a substantial portion of the cable's capacity will be used for educational, health care, and public safety services, for example, how will these services be paid for? Costs must be estimated and compared against the anticipated value to each agency.

Another factor, and possibly most difficult of all, is the willingness and ability of each local government to overcome organizational and bureaucratic inertia in establishing a new framework through which to use the cable for the public good.

This reflects itself not only in reorganizing governmental agencies to take advantage of the cable, but also in the franchise approach. If, for example, a cable network which will be used extensively for public communications is desired, one option is to consider two distinctly separate cable systems — one for classical CATV system entertainment services, and the other cable communications system dedicated to nonentertainment services. There is no compelling reason, other than sharing duct and pole facilities, why one franchise need cover both.

Again, no simple solutions exist, but it is true that the more diverse use local government desires from a cable system, the more options will be available, and the more analysis and evaluation will be required.

Post-Franchise

After a franchise has been granted, and a cable system installed, at least two tasks for local government will remain to be performed on a continuing basis:

— Monitoring actual performance in each area of cable use to determine how closely it matches the original objectives

— Evaluating new cable uses and applications in the light of evolving technology, market demand and costs.

In these areas, local government is the sole jurisdictional authority. The FCC's regulations specify technical standards that cable systems must meet,[1] and also tests that are to be made to verify that the standards are being met, but impose no monitoring requirements on cable use. State regulation, to the present, also has not concerned itself with uses and applications.

There is no established procedure for monitoring cable use. One approach might be to centralize the function under a single local governmental agency, such as an office of telecommunications. Another alternative is to appoint specialized boards or committees in each area of use. For example, a medical/hospital board might evaluate the use of the cable system for health care communications, an educational board for use in education and training, etc.

The results of such monitoring and evaluation can serve as guides to influence the future use of the cable system. In addition, a periodic review (perhaps every two or three years) should be made as to whether technology, costs or market demand have changed significantly, so that services which previously were impractical have become practical and should be implemented.

[1]For Class I (retransmission) channels only.

CABLE TELEVISION
INFORMATION CENTER

CABLE USES SURVEY

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INTRODUCTION

The Federal Communications Commission, in its 1972 Cable Television Report and Order, distinguishes between two types of of nonbroadcast channels. The first type is commonly referred to as the "local origination" channel. This channel is programmed by system operators as they choose, within the rules laid down by the FCC and appropriate state and local regulatory agencies. (These rules deal with such things as equal time provisions, obscenity, lotteries, and so on.)

The second type of nonbroadcast channel is the "access" channel. There are four categories of access channels: public access, educational access, government access and leased access. In the main, the programs presented on these access channels are not controlled by the system operators.

As specified in the 1972 FCC report, the distinctions made between the two types of nonbroadcast channels and the distinctions made among the categories of access channels are clear-cut. However, the cable world has not yet conformed to that orderly document. Most systems operating today are "grandfathered," and the rules will not apply to them until 1977. Many systems are not within the 100 largest television markets and, for these systems, the rules may never apply. Nevertheless, the rules are based on reality in the sense that there are such things as public access programs and educational programs. Municipal affairs do get cablecast and channels are sometimes leased.

At present, these different kinds of programs and uses overlap. A number of systems provide time on the local origination channel for public access programming. In Natrona County, Wyoming, the local library leases a channel. The San Pablo, California, municipal government, through its Parks and Recreation Department, does all the programming on the local origination channel.

Therefore, this report will not only survey developments within the defined nonbroadcast channels, but will also touch on the "cracks between the channels." Additionally, the report will discuss pay TV, the hybrid that straddles the classifications.

ACCESS CHANNELS

Federal Communications Commission rules state that "the operating rules governing public access, educational and leased channels shall be filed with the Commission within 90 days after a system first activates any such channels...." (C.F.R. 76.251 (a)(11)(iv)). As of August 1973, no system had filed such operating rules.

A few systems, grandfathered under the FCC rules, have in fact activated channels for access, and many systems are carrying educational, municipal, and public access programming on their local origination channel. But by and large, access programming as such is rare.

Among the access channels, the leased variety would seem to be the most likely place for activity to appear since these are the channels that hold promise of profit for the operator. However, with the exception of some pay TV experiments now going on (see "Hybrids," below), the use of leased channels has been sparing.

This is so for two reasons. First, cable operators who have spare channels have made no real attempt to market them. This is due, in part at least, to confusion over the FCC rules which state that the system must establish rules requiring--"...non-discriminatory access... [and] specifying an appropriate rate schedule (C.F.R. 76.251 (a) (11)(iii)). Operators are not sure if they are allowed to charge civic groups token $1.00 a year rates when other users must pay some higher fee; if "non-discriminatory access" implies equal rates for all commercial users; or how to manage percentage-of-revenue rate schedules. At present, the operators seem content to wait until consumer demand grows to the point where near-term profitability will justify the rate struggle.

The second reason for the current stagnation of leased channels is that consumer demand is simply not there. With a few exceptions, entrepreneurs have shown scant interest in leasing channels for purposes of advertiser supported origination. Aside from the limited entrepreneurial activity and from pay TV, the bulk of consumer uses is dependent on relatively advanced two-way systems--for such leased

uses as security systems, shop-by-cable, data transmission, or polling. At present, most of these functions can either be handled more efficiently through other mechanisms--such as facsimile transmission via phone lines--or have not yet been done at reasonable expense by anyone (from-home merchandise shopping, for instance). Thus, significant leased channel usage seems destined to wait until either the FCC rules are clarified and/or two-way systems provide impetus for groundswell consumer demand.

The use of public access channels is somewhat difficult in light of FCC regulations--albeit different regulations. The regulations state that "[The] system shall exercise no control over program content..., however, this limitation shall not prevent it from taking appropriate steps to insure compliance with the operating rules..." (C.F.R. 76.251 (a)(9)) and "[The] system shall establish rules...prohibiting the presentation of: any advertising material...; lottery information; and obscene or indecent matter..." (C.F.R. 76.251 (a)(11)(i)).

The two rules, taken together, have presented a problem. Many operators feel that the rules hold them legally responsible for the content of the material presented but, at the same time, do not allow them to censor that material. Apart from the uneasiness brought on by the ambiguous legal position, cable operators have an additional reason for preferring to cablecast "public access" on the local origination channel. It is an inexpensive way to program and a way which builds community identification with the channel.

The conditions which tend to steer "public access" programming onto the local origination channel will change as new systems are built under the 1972 FCC rules which require a public access channel.

Even now, before the rules apply, some public access channels are in use. In Ann Arbor, Michigan, a channel devoted entirely to public access cablecasts from 2 P.M. to 10 P.M. Taped material must be submitted a day in advance so that it can be screened for technical quality. There is no pre-screening for content.

Two other cities which have active public access channels are Orlando, Florida, and DeKalb, Illinois. Both systems received cooperation from Alternate Media, of New York University, in training local people to use the equipment. Both systems employ a public access coordinator, paid by the cable system, to schedule times,

handle technical problems and so forth. Each public access channel is run by a defined group which made arrangements with the cable operator for the use of studio and equipment. And both public access groups have policy boards which pre-screen the material in order to ensure that it follows the FCCs regulations. Pre-screening by third parties makes it questionable as to whether these channels are operating in the way originally conceived by public access proponents.

No problems of content have been reported either under the open access system used in Ann Arbor or under the more structured systems in Orlando and DeKalb.

There has been some use of the educational access channel[1] across the country, although the ultimate structure that will emerge is still in the evolutionary process. Channels have been activated, in, among other places, Elmira and Corning, New York; Amherst, Massachusetts; and Corvallis and Eugene, Oregon. Most of the activated channels, however, are used exclusively by one school system or another. In Elmira and Corning, the local public school systems control and program the channels--either with material furnished by the state, by off-the-air reception, or by their own origination. The channels in the two Oregon cities are programmed by universities.

The situation in Amherst may be a harbinger of problems to come. The Amherst public school system, pursuant to an arrangement with the cable company, has been programming a channel. Most of the programming is done during daytime hours, although a few programs, such as that done by the athletic coaches, are cablecast in the evening. Recently, Hampshire College decided to cablecast on the channel. This has led to a jurisdictional dispute over who has the right to cablecast and when. The Amherst Selectmen have now shown signs of entering the controversy with a proposed declaration that the channel is not an educational channel at all but a public access channel and the educators will have to get in line with everyone else. This kind of problem is not resolved under the 1972 FCC rules which state simply that "Each...system shall maintain at least one specially

[1]For a more comprehensive report on the educational uses of cable television, see Cable Television and Education. A Report from the Field. The National Cable Television Association, 918 16th St., N.W., Washington, D.C. 20006.

designated channel for use by local educational authorities" (C.F.R. 76.251 (a)(5)). "Local educational authorities" is left to others to define. In a typical metropolis, a traffic jam is likely to develop. Detroit, Michigan, and its suburbs, for instance, contain branches of the University of Michigan, Wayne State University, Oakland University, Wayne State Community College, and the University of Detroit, in addition to the public schools, a host of private primary and secondary schools, arts and technical colleges and a few "free" schools.

A number of franchising authorities are beginning to grapple with the problem of educational access, although no city has yet arrived at a solution. The Boulder, Colorado agreement, for instance, provides for a task force to study the arrangements necessary for equitable access to the channel. This is a problem that the local authorities, particularly in the larger cities, must solve before educational channel usage can develop in a rational manner.

If the leased, public, and educational access channels have been marked by minimal usage, the local government access channel has been distinguished by almost no activity. So far as the Cable Television Information Center knows, no significant governmental channel usage has been developed. Those functions which have been covered--city council meetings, interviews with public officials, public hearings--have been cablecast on local origination channels. Some cities have used the local cable system equipment and expertise in order to make training films for their own closed circuit purposes (Sunnyvale, California, and the Wilmington, Delaware Fire Department, for instance) but the channel itself has not been used--even, as in the case of Sunnyvale, California, when the local franchise calls for the establishment of such a channel.

Some activity does seem to be occurring in the planning stages, however. Tulsa, Oklahoma, which expects to have an operating cable system within a year, has placed the nerve center of the municipal channel within the public library. Decisions have not yet been made regarding how departments will be scheduled, how budgets will be assigned, how actual production will take place, and so on. Arlington, Virginia, which does not expect its cable system to be in operation until 1976, has already appointed an interdepartmental committee to study the problems that may arise concerning the government channel. The departments represented (the county manager's office, the recreation

department, the police department, planning, human resources, public utilities, and the public library) were those expressing initial interest. Arlington expects that eventually all departments will be included. Arlington is one step behind Tulsa, in that the Virginia county has not yet determined where the nerve center of the operation will be housed.

As with the educational channel, certain problems will have to be settled before the local government channel can develop. Each franchising authority must first decide whether to activate the channel at all. For some governments, the trade-off of increased communications vs. cost may not justify activation--particularly in the light of other priorities. If the activation decision is made, local authorities will then have to make the appropriate locational, personnel, programming, and budgetary decisions. In the actions of Tulsa and Arlington, we are seeing the first steps on a rational path to governmental usage.

LEASED ACCESS CHANNEL

Example 1

The Natrona County Library, in Casper, Wyoming, leases a channel for $1.00 a year from Community TV Systems of Wyoming (LVO). The library is responsible for the maintenance of its own equipment--cameras, recorders, etc. Likewise, the cable company maintains its equipment, such as transmitters, housed in the library. Library cablecasting includes a phone-in video reference service available anytime during library hours except when the time is preempted by other library offerings.

Recently the library cablecast Public Forum, a 21 part series which featured public figures discussing issues pertinent to Casper. A follow-up survey indicated that 4,500 of the 11,000 cable subscribers had watched at least one of the programs. Of the people who watched, 95 per cent wanted the library to do more programs of a similar nature. The library has compiled a collection of pre-school story tapes, made by library staff members and students in the local public school and university drama classes. These tapes are used to program the newly instituted dial-a-story cable service. Pre-schoolers can call and request a story in much the same way that teenagers phone-in record requests to radio disc jockeys. The library has about 40 hours of children's tapes available for the service.

Example 2

Cable 11, in Rapid City, South Dakota, is operated by Richard Shilvock, who leases the channel from Rapid Cable TV (Community Tele-Communications). Shilvock pays a monthly fee for full time use of the channel and studio equipment. Cable 11's news coverage is heavily local and is usually done remote-on-tape, both from a fully-equipped truck and with portable videotape recorders. Normal beats include the highways (both for accidents and tourism reports), police stations, political party headquarters, and so forth. Sports, music, and local entertainment also have their slots. Cable 11 covers its costs through the sale of advertising. Shilvock says he is meeting his goal of $126 per hour in advertising revenue, and is in the process of expanding his operation. He is now negotiating to lease channels on other South Dakota systems and hopes, in the not too distant future, to have a statewide leased channel network.

PUBLIC ACCESS CHANNEL

TelePrompter Manhattan has a fully programmed public access channel, Channel D. A typical week's program schedule is shown below.

Program Schedule
Channel D, TelePrompter Manhattan
January 1 to January 7, 1973

Monday, Jan. 1	5:00	High School Exchange
	6:30	Plight of Soviet Jewry
	9:00	Schizophrenia Videotape
	10:00	Vietnam Veterans
Tuesday, Jan. 2	1:00	High School Exchange
	8:00	Harlem Here It Is
Wednesday, Jan. 3	6:30	Plight of Soviet Jewry
	8:00	The Voice of the Gospel Soul
	9:00	Schizophrenia Videotape
	11:00	Vietnam Veterans
Thursday, Jan. 4	7:30	WJJC TV - John Jay College of Criminal Justice
	8:30	High School Exchange

Friday, Jan. 5	8:00	Cinema Forum
	9:00	Schizophrenia Videotape
	10:00	Vietnam Veterans
Saturday, Jan. 6	8:30	WJJC TV - John Jay College of Criminal Justice
Sunday, Jan. 7	6:30	WJJC TV - John Jay College of Criminal Justice
	8:30	Expose - Emile Jones
	9:30	Cinema Forum - Filmmakers' Co-op - Charles Levine

EDUCATIONAL USES

An Example

Malden (Massachusetts) Cablevision (Warner) has three programs on the local origination channel, which are produced in conjunction with the local public school system.

1. Training Program

A credit course is taught twice a week at the Malden studio. In 1972-73, eleven high school students participated in the cablecasting class, in which technical, production, and editing aspects of program origination were taught. The class, which ran through the school year, produced shows which included dramas, vignettes and features related to such school activities as fund raising drives. The shows were cablecast biweekly. Next year's enrollment in Malden's cablevision course will be 15--the maximum number that can be handled in the studio. The system operator anticipates adding an extra section next year. The cable system located a teacher for the class, who was then hired by the school system on a part time basis at $2,000 a year. He was assisted by the cable company's educational director.

2. Kids Today

Each week a class from one of Malden's elementary schools (about 30 youngsters) is transported to the studio to participate in a cablecast class. The class is led by a professional from the area. Guest instructors have included a chef, a dance troupe, and a herpetologist. Class participation is high; for instance, when the chef led the class, he demonstrated the art of omelet making. While he lectured, the youngsters sliced onions, greased pans, turned omelets, and so on.

Participating schools are chosen on a rotating basis by the cable company. The educational director calls the selected school and requests a class of the appropriate age group (the chef had 2nd graders). The cable company arranges for transportation--the school pays for the transportation.

The program runs weekly all year long, with local day camps providing the participants during the summer.

3. Youth Forum

Unlike the two programs mentioned above, "Youth Forum" is cablecast live. It utilizes a casual conversation format in which a number of high school students, a teacher and, if appropriate, a professional from the community discuss a topical issue.

The cable operator selects the topic, posts notices in the high schools, and selects participants from volunteers. Topics have included drugs, abortion (2 women who had had "back room" abortions participated), local employment conditions, health foods, and broken homes (participants were all from broken homes).

The set is a group of cubes on which the participants perch. The discussion begins before cablecast time and the camera is turned on without the participants being aware at what point they are on the cable. Similarly, the program fades out at the end. The director feels that this contributes to a relaxed atmosphere.

The program, which would normally go off the cable for the summer, was continued through summer of 1973. One of the high school students wanted to act as a moderator and the cable operator gave him the opportunity.

While the system normally solicits spots--particularly when the sports are cablecast--commercials are not accepted for educational programming.

MUNICIPAL USES

Example 1

All Channel Emergency Alert:

Berks TV Cable Company (ATC) in Reading, Pennsylvania, provides an emergency bulletin override capability. In the event

of a major emergency (fire, weather catastrophe, etc.), the city official legally authorized by city ordinance to declare an emergency, notifies the cable company of the impending announcement. Next, slides are projected (for a period not exceeding 30 seconds) on all 12 cable channels, directing viewers to turn to channel 5 for details of the emergency announcement. The official then appears live on channel 5, immediately after the "All Channel Alert," making the statement of emergency and explaining the nature of the crisis.

Example 2

Vumore Video Corporation (Cablecom General) of Colorado Springs, Colorado, cablecasts a half hour "Job Line" show each weekday. Designed to inform viewers of employment opportunities in the area, the program is produced with the cooperation of the state employment agency. The program includes interviews with representatives of the state employment agency, area employers, training schools, and trade unions. Available positions are announced and interested viewers call the local state employment office for more detailed information.

LOCAL ORIGINATION

Local origination, in its literal sense--that is, not film showings or national syndications--has had mixed results. When the Federal Communications Commission ordered all systems with more than 3,500 subscribers to originate locally in 1969, studios and equipment were installed in those systems and local programming began. In 1971, while litigation was pending, the commission suspended the rule and despite the ultimate decision supporting its position, has not reinstated the requirement. Many of the local origination channels were either abandoned or their programming was sharply cut back when the rule was stayed. The reason for this is that local origination is expensive and cable operators were unable to generate sufficient advertising revenue to cover costs.

Some systems, however, continued local origination for several reasons. In some instances, particularly in areas where off-the-air reception is of tolerable quality, local origination has value in attracting subscribers. In many instances, cable operators have felt an obligation to operate as the FCC regulations imply they should, "...to a significant extent as a local outlet by origination cablecasting..." (C.F.R. 76.201 (a)).

Many of the locally originating systems--particularly those systems operated by larger cable companies--and, recently, some of the smaller companies and independents have taken aggressive marketing positions vis a vis their local origination. This latter move has, in several cases, been accomplished by turning over the entire local origination responsibility to an outside agency--either an entrepreneur, a civic oriented group, or, in at least one case, the parks and recreation departments of the city.

Two distinct trends seem to be developing. The first, on the part of the smaller MSOs (multiple systems operator) and the independents, is the move toward an outside contractor as the local program originator. This is not to say that most, or even a large minority, of systems have "farmed out" their origination. On the contrary, most do their own. But a mini-trend toward outside contractors seems to be developing. This arrangement is different than a leased channel arrangement since (1) the legal responsibility for content under local origination rests entirely with the operator, and (2) access rules do not apply.

The financial arrangements between the contractors and the operators have been of two types. The first type is a percentage-of-ad-revenue arrangements in which the operator gets a given percentage of the gross. The contractor uses the rest to pay salaries, maintain equipment, and purchase supplies. The second arrangement is really no arrangement at all. The contractor is given, at no charge, a channel, and in some cases, a studio and equipment. The advantage to the operator lies in the fact that local origination helps him sell hook-ups and allows him to deal with technical matters while the contractor worries about meeting the programming needs of subscribers.

The second trend, on the part of the larger MSOs, has been toward local origination focusing on regional program swapping or, in a few cases, national syndication.

These are much more traditional arrangements than the contracts mentioned above. A crew is hired, a channel assigned, and they begin, arranging a mix of local interest programs, regional swaps (usually such programs as athletic events, cooking shows, or exercise programs), national syndications (such as TelePrompter's "Window on Washington" or "Science Game") and re-runs from broadcast TV.

Few of these operations are functioning "in the black," although the size of the minority of profitable local origination operations seems to be growing. Whether this upward trend is due to the fact that viewership has reached a point where advertising on the cable has become attractive, or whether the local originators have become more savvy about cutting costs, or whether the local ad salesmen are becoming better at marketing, is unclear. But there are some indications that local origination is becoming an established medium.

LOCAL ORIGINATION

Example 1

Cablevision Channel 6 (Cablecom General) in Santa Rosa, California, is a traditional local origination operation. There are about 30,000 subscribers to the system. The personnel are all employed by the cable operator. The production staff includes a general manager, assistant manager, public relations director, production coordinator, news director, and sales manager. The

channel is very sales-oriented and much of the programming is not only locally oriented but tailored to the needs of the local advertisers. Two weekly programs, "Looking at Real Estate with Phil Patterson" and "Garden Goofs," for instance, were specifically--and successfully--produced for local sponsorship. The Channel 6 staff feels that a profitable operation allows them to do more and better quality public service programming than would otherwise be possible. A weekly program, "Medicine Today" is an example of the channel's public service cablecasts. Produced with the cooperation of the Sonoma County Medical Association, the program is designed to keep the public aware of current medical developments. Actual operations performed in local hospitals have been taped with physicians discussing various aspects of the surgery.

Example 2

Local origination at the Cox Cablevision system in Aberdeen, Washington, is done by Donald Moyer, who leases the studio from the cable operator. This is not a leased channel arrangement since the cable operator, not Moyer, has the ultimate authority over program content, and access rules are not applicable. Payment, however, more closely resembles a lease agreement than an outside contractor arrangement. Moyer sells ads to sustain his programming and the cable operator receives 24 per cent of the gross ad revenue. Between 12 and 15 hours of basic programming is cablecast each week. Programs include military films supplied by local recruiting offices, a daily newscast, a quiz show on which questions are cablecast and viewers phone in the answers, an arts and crafts program, an outdoor show, and a writers' workshop led by a local author.

Example 3

All local origination on Aspen, Colorado's Canyon Cable (Continental Cablevision) is done by a local nonprofit corporation, Grass Roots Network. The programming consists of one hour per week of local feature coverage, repeated three times a week.

Grass Roots was begun by John Smith, who had formerly been in the Communications Department of the University of California. Smith wanted to see if an existing cable system could be developed as a community resource. To that end, he formed Grass Roots, a nonprofit cooperative, and began training and using local talent.

Two years ago, Canyon Cable gave Grass Roots permission to use channel 12. This seems to be the only connection between the cable company and the network. No written agreement has ever been recorded. Grass Roots has its own tape deck and feeds its programs directly into the system. They do not make use of Canyon's facilities.

Aside from the hour-long feature coverage mentioned above, Grass Roots also provides audio coverage, via phone lines, of all public meetings, and coverage of special events, such as local election coverage.

Last summer, Grass Roots taped the 10 episode soap opera "Edge of Ajax" (Ajax is Aspen's mountain). This was a community project written by, for, and about the Aspen population. The episodes were shown as part of the regular feature program. Eventually the tapes were edited and transferred to film, forming a full length motion picture which had its world premiere at the Aspen Opera House. Proceeds just about covered the excursion into film making.

Grass Roots operates much like a civic theatre. The local citizenry seems to be genuinely involved in the tape making process and in the financial support of the venture.

PAY TV: THE HYBRID

By August 1973, about a dozen pay TV companies were furnishing hardware and/or programming material to about 20 cable systems. These systems, in aggregate, had signed up about 35,000 pay TV subscribers.

As a percentage of the slightly more than 3,000 cable systems and nearly eight million cable TV subscribers in the United States, the numbers involved in the pay TV experiments are not particularly impressive. But the tests, as a vehicle to predict the future development of the industry, have much greater import than the numbers would suggest.

Cable television is one of the most capital intensive of industries. In order to generate funds for the development of services beyond the simple improvement of and addition to broadcast signals, vast amounts of money must be plowed into capital development. The revenue generated through the provision of traditional one-way broadcast retransmission may not be sufficient to finance significant expansion of new services. Therefore, many industry spokesmen contend that if the industry is to expand into the "blue sky" of consumer and social services, either pay TV or some other revenue producing enterprise must provide the wherewithal.

This is not to say that if pay TV produces riches beyond wildest imagination, the country will be transformed into a communications paradise. Many factors mitigate against that happening--factors such as political expedience, ill-conceived experimentation, or the simple greed of some entrepreneurs. However, in order to arrive at "The Wired Nation," the generated revenue might be a necessary even if not a sufficient condition.

Thus, the pay TV experiments are of prime importance.

These experiments are designed to test a number of things including the reliability of the hardware, the kinds of programs subscribers will buy, and marketing methods (i.e., per channel vs. per program charges). The object of the tests is to arrive at a package that will cause the maximum number of people to subscribe to pay TV and to remain as subscribers.

A variety of systems are being tested. The arrangements between the pay TV companies and the cable operators fall into

three basic categories. Some pay TV systems lease channels from the operator, with lease payment determined by some share of subscriber revenue. The cable company provides only the conduits through which the program flows to the homes. Optical Systems (in San Diego, California) and Cinca Communications (in Long Beach, California) use lease agreements.

Some pay TV programming is totally a part of the local origination operations of the cable system. The cable operator completely controls all phases of the operation, from the procurement of the programs through the provision of the hardware, to the operation of the system itself. Warner Communications, with its Gridtronics system, is this type of operation. (In Reston, Virginia, and Winter Haven, Florida, are further examples.)

Other pay TV operations are a mixture of functions. In some cases, the pay TV company provides only the programming. In other cases, the pay TV company provides programming and hardware while the operator performs marketing and billing functions. Home Box Office (in Wilkes-Barre and Allentown, Pennsylvania) is an example of a company which provides programming only.

More important to the consumer than the business arrangement between cable operator and pay TV entrepreneur, is how the viewer will be billed and for what. All pay TV companies provide first-run movies and the fare does not differ significantly from one company to another. Many of the companies provide a sports package and "special events." Home Box Office, for instance, provides a Madison Square Garden package and has shown such specials as the Chinese gymnasts. There has been little done in the way of cultural programming except for the Trans-World tests running on Suffolk Cablevision in Smithtown, New York. Trans-World, in addition to movie and sports channels, provides a separate Channel C, split into three time periods. Morning through afternoon, short children's features made by the Learning Corporation are shown ("Art in Motion Pictures," for example); late afternoon through evening, family features are provided ("Born Free," for example); and after 10 P.M., adult theatre takes over. Adult theatre is a mixed bag which has included "MacBeth," Nureyev's "I Am A Dancer," and an occasional R-rated movie.

Method of billing varies from pay TV system to pay TV system. Home Box Office, with its "magazine concept," offers its entire range of programming on one channel and bills the subscriber about $6.00 monthly for the entire channel use. TheatreVision also uses one channel, with bills on a per-program-watched basis. The Trans-World multi-channel system also bills on a per-program basis, with charges ranging from $1.00 to $3.00 depending upon the program selected. Optical Systems' Channel 100 has optional billing systems. The subscriber can take a weekly $2.25 rate or a season subscription for $19.50.

The kinds of billing systems used, the arrangements between cable operators and pay TV companies, and the type of fare offered will ultimately be determined by the results of the current testing periods.

Problems which may arise in pay TV's future come from both internal and external sources. Internally, the uncertain reliability of the hardware and the difficulty in obtaining sufficient quantities of quality programs have persuaded some subscribers to disconnect. The picture quality has not been uniformly excellent--either because of technical difficulties or because of content. Industry executives have not been willing to specify the disconnect rate; but it is apparently sufficiently high to cause some concern but not high enough to severely dim projections of a rosy future.

The external problems are looming in Congress and the Federal Communications Commission. Pending copyright legislation, if passed in a form least favorable to pay TV interests, could result in pricing some desirable programs beyond the reach of pay TV companies.

The recently passed bill which prohibits, for an experimental period of three years, the TV blackout of some home football, baseball, hockey, or basketball games might, in conjunction with FCC anti-siphoning rules, ban many popular sports events from pay cable.

Briefly, the anti-siphoning rule states that any sporting event telecast during the previous two years on regular broadcast television cannot be shown on pay TV.

The anti-blackout bill prohibits broadcast TV blackouts of professional home games if all tickets are sold 72 hours before gametime.

Thus, it is possible that home pro football games must be telecast on broadcast TV. If they are regularly telecast, then it is embargoed from pay TV for a period of five years (the three-year experimental period plus the two-year embargo).

It is not clear, however, that the anti-blackout bill will trigger the anti-siphoning rule. The bill specifies an experimental three year period. Between now and the end of that time either Congress or the FCC may act to prevent the anti-siphoning rule from going into effect in this area. If neither body acts, the rule will probably be held to have been triggered.

The actions or non-actions of Congress and the FCC, together with how successfully the pay TV companies resolve the industry problems will have a significant impact on the future of cable television.